Smithsonian

October 1984

Antarctica

Scientists are now unraveling its icy mysteries, but a storm is brewing over its resources (p. 48)

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Smithsonian

Volume 15, Number 7

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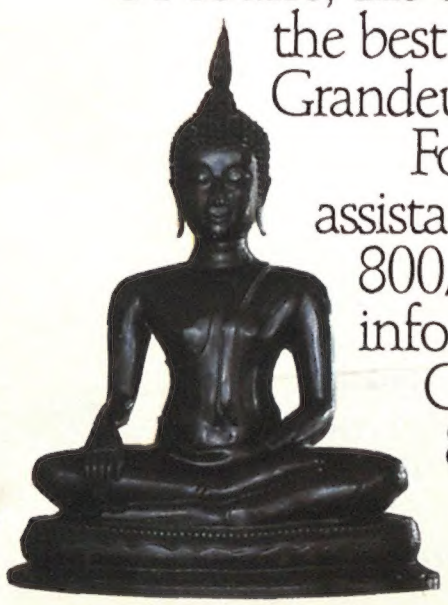

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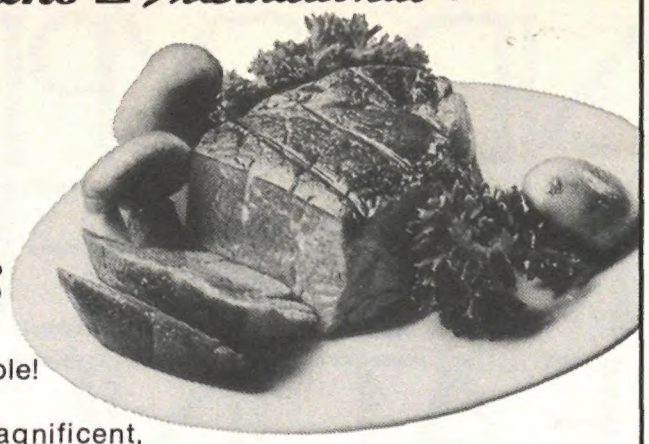

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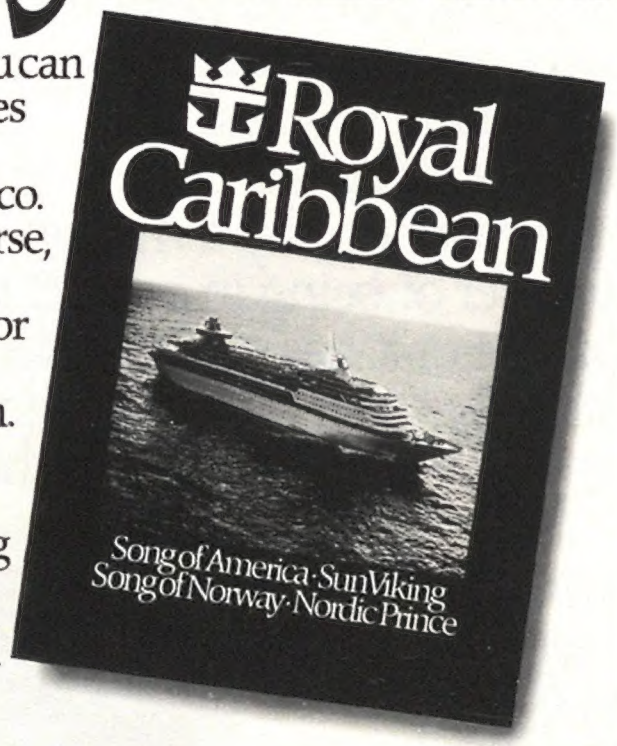

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Smithsonian horizons

Assuming the responsibilities of Secretary of the Institution entails a commitment not only to its past but to a larger vision

Last month Dillon Ripley's extraordinary two decades and more of service and achievement as Secretary of the Smithsonian came to an end. The Institution's grand core-purposes remain what they always were, a breathtakingly unqualified commitment to the "increase and diffusion of knowledge." But the mix of topics under study and on exhibit has changed and broadened, in ways so well known to readers of SMITHSONIAN that they hardly need to be recapitulated.

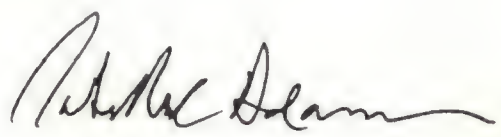
Today the Institution's activities are closer than ever before to representing the full diversity of human knowledge, from the arts and humanities to technology and some of the most basic of the natural sciences. Its scale meanwhile has grown immensely, although in such an organic, measured way that an accurate before-and-after contrast would be difficult to reconstruct from memory.

I don't know where the phrase originated, but one hears repeatedly, among dwellers in the Washington area who can visit it most frequently, of a "museum for all seasons." This was a collective as well as gradual achievement, of course, built on thousands of individual ideas and efforts. But there is no denying that Dillon Ripley's was the guiding vision under which the modern arts of public communication were first brought into fruitful union with the classic scholarly concerns of the Smithsonian.

It is trite to say that his will be a hard act to follow, although it is no less than the simple truth. My own acquaintance with the Smithsonian, never previously more than a passing one, does not yet penetrate very far beneath the surface. My taste in museums, for example, will have to proceed rapidly outward from a prior preference for the flawless, if perhaps a bit hermetic, little jewel of the Freer to embrace also the soaring spaces, greater heterogeneity and intentionally more open-ended appeal of its larger, more popular sibling galleries and museums. To be asked to step forward suddenly and deal with all of this range of responsibility requires a leap beyond any prior experience or ambition.

A recurrent theme in the letters I have received is that the Smithsonian is more than a national treasure-house, that it has become one of our precious handful of unifying symbols. The writers sometimes suggested that this has led the way toward a broadening of the many meanings of Washington itself, into cultural realms well outside those formerly associated with our national seat of government. Well, it is only candid to admit that I may be still largely ignorant of most of the details. But I do share their—and I hope your—larger vision of the Smithsonian.

There is general agreement that this column should continue. Nevertheless, it is only fitting that Mr. Ripley's own title for it, *The view from the castle*, should somehow be replaced. After all, the numbered jerseys of great quarterbacks retire with them to permanent places in the Hall of Fame. We have different areas of sensitivity and expertise. No doubt we will be found on occasion to see the world differently. But it is an honor to follow him. Recognizing that conditions will always be changing, I will do everything I can to carry forward his work.



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Letters to the Editor

Corn

Dear Sir: Corn may be king in Iowa, but you might say it is the crowning glory of Illinois farmers.

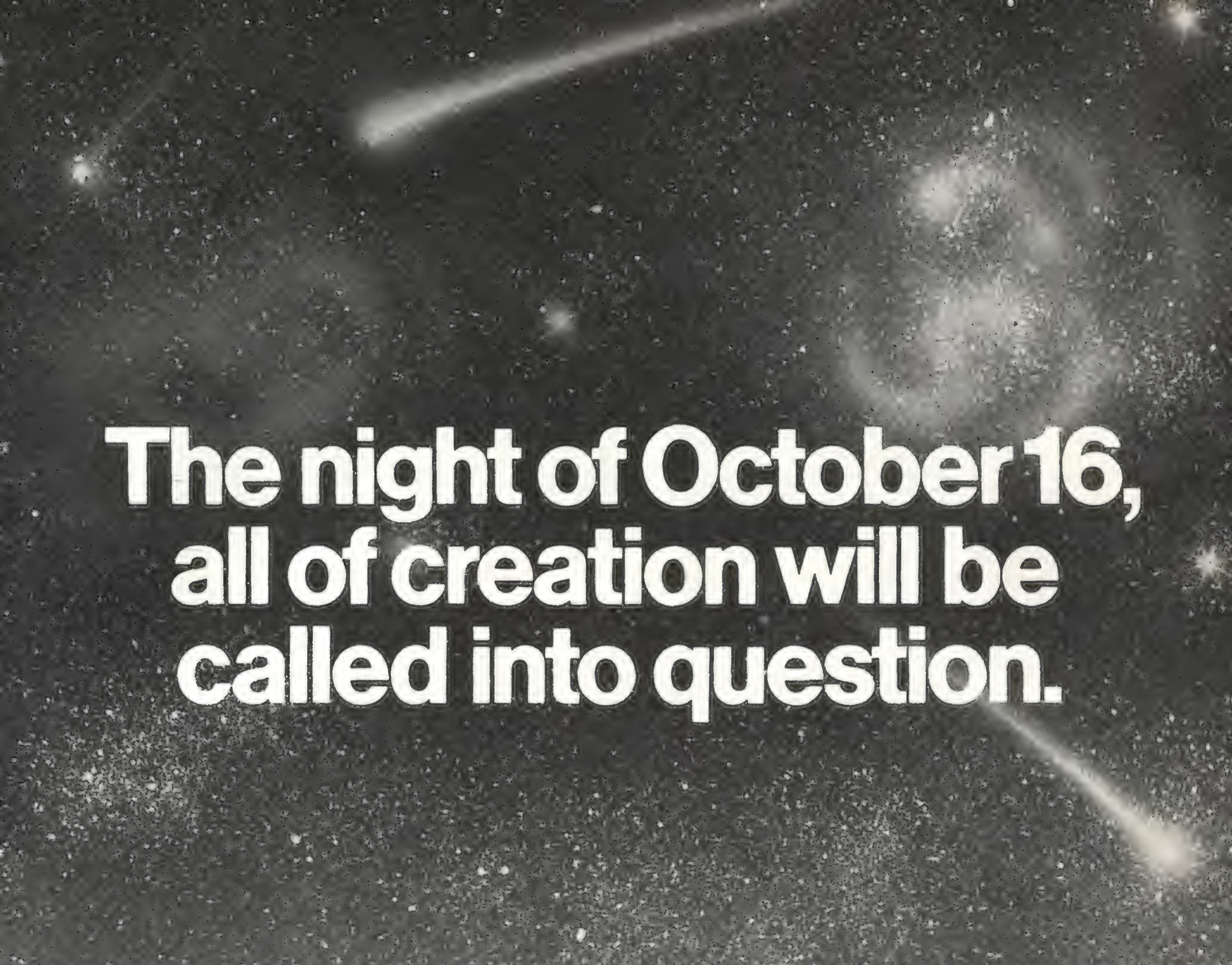
How could you have overlooked little Moultrie, one of the smaller of the 102 Illinois counties, with a total population of around 15,000? For several years it has led the entire state in bushels of corn produced per acre, and may well lead again this year despite two months' serious drought. Ample rain replenished the subsoil moisture last spring and the corn appears to have rooted down deep enough to tap that moisture.

Many members of the Old Order Amish live and farm in the northeastern part of the county, and even with their horse-drawn equipment manage to produce near-record corn yields.

Moultrie County may be small—but we make our mark in many ways when it comes to agriculture.

Byron Brandenburger
Sullivan, Illinois

Dear Sir: My mother was born in Grundy County, and as a boy I would go there with her from our home in South Dakota to visit her brothers and sisters and my numerous cousins. Her father, Fritz Strohbehn, was a true pioneer in that fertile county. Soon after settling there he became an extensive dealer in cattle. He would buy feeder stock for his neighbors, who would fatten it for the gain; my grandfather then would handle the marketing. It was said he rode the stock train to Union Stockyards in Chicago more than anyone in Iowa. He had a profitable operation and continually



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added to his land holdings. All this without huge machines, commercial fertilizer, expensive fuel or hybrid corn. At the time of his death in 1911 he was worth close to one million dollars.
Robert E. Eggers
Los Angeles

Dear Sir: As a Corn Belt transplant out here in California, where my friends think I'm from "back East," I appreciate having an article I can show them that fills in so well the heartland of my own past life. As an instructor of local history I appreciate having an article to show my students which so adeptly combines historical information, economic analysis and the rich American idiom that oral interviews offer us. And David Plowden's black-and-white photographs stunned me with their stark, sweeping lines. Those breathtaking metal bins rival Ansel Adams' *Half Dome*.
Mary Rehwold
Quincy, California

Erastus Salisbury Field

Dear Sir: I was brought up on stories about Erastus Field. My great-great-grandfather, Charles Cooley, built a square brick homestead in Plumtrees, Massachusetts, which had an attached shed in which Field stored his paintings.

The Cooleys befriended the old man, who lived in a shack around the corner, and my mother, now 101 and very alert mentally, can remember visiting her cousins at Plumtrees. The children had great fun going into the upper reaches of the shed and giggling over some of the pictures, especially the plague series. One depicted the waters turned into blood and the people in the scene holding their noses because of the smell. Another was about the plague of lice, and the figures were furiously scratching themselves. These paintings delighted the children.

Field painted portraits of my great-great-grandparents, Charles and Mary Stowell Cooley, and of several other relations, and so our family takes a real personal interest in any reference to this truly New England painter.
Cloyce Cooley Campbell Reed
Harvard, Massachusetts

Dear Sir: The resemblance between Clarissa Cook, reproduced in Frank Getlein's article, and the woman in Field's *Joseph Moore and Family*, which is owned by the Museum of Fine Arts in Boston, is remarkable. It must be either the same woman—or a twin.
Ruth E. Tap
Gallipolis, Ohio
Field painted the three Gallond sisters (details below): Clarissa, wife of William Cook; Louisa, married to William's brother Nathaniel; and Almira, wife of Joseph B. Moore. Ed.

Dear Sir: Frank Getlein describes Field's painting, *Lincoln with Washington and his Generals*, as "ludicrous." While I have no real quarrel with Mr. Getlein's critical assessment, I sense that he has misunderstood the iconography of the piece, principally by misidentifying one of its subjects, and thus made it seem more absurd than it is.

It certainly would have been "preposterous" had the artist depicted General Ambrose Burnside along with Washington, Lincoln, Grant, Hayes and Arthur. But the figure you and Mr. Getlein—and, in all fairness, Mary Black's catalog as well—identify as Burnside is in reality James A. Garfield.

Thus Getlein's amazement at the "ab-

Shelburne Museum, Vermont

Clarissa Gallond Cook

The Art Institute of Chicago

Louisa Gallond Cook

Museum of Fine Arts, Boston

Almira Gallond Moore

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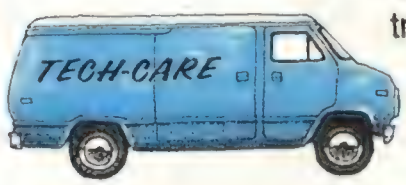

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sence of Generals Sherman and Sheridan and the presence of, of all people, Rutherford B. Hayes," in what he mistakenly perceives to be a straightforward military painting, is unwarranted. Field apparently painted this work to represent the Union Army veterans who became Presidents, along with the country's foremost commanders in chief, George Washington and Abraham Lincoln.

Significantly, Field shows Lincoln lavishing the same personal affection on Garfield [a hand on his shoulder; detail below] as the symbolic figure of Washington lavishes on him. That was because

Museum of Fine Arts, Springfield, Massachusetts

Garfield had just been assassinated when the picture was painted, and many artists of the day elevated him, briefly, to the pantheon occupied hitherto only by the founder of the Union and its preserver.
Harold Holzer
Rye, New York
Mr. Holzer is correct; the figure at left is Garfield. We and Mr. Getlein worked from the exhibition catalog. The Springfield Museum of Fine Arts, owner of the painting, discovered the mistaken identification after the catalog was printed, corrected the exhibition label, but did not issue an erratum. Ed.

Dutch surge barrier

Dear Sir: Your story concerning Dutch efforts to continue their struggle against their "perennial enemy, the sea" reinforces the traditional view of Man that the natural aspects of our planet are to be controlled for human well-being. Such a view has left us with devastating pollution, mismanagement of agricultural eco-

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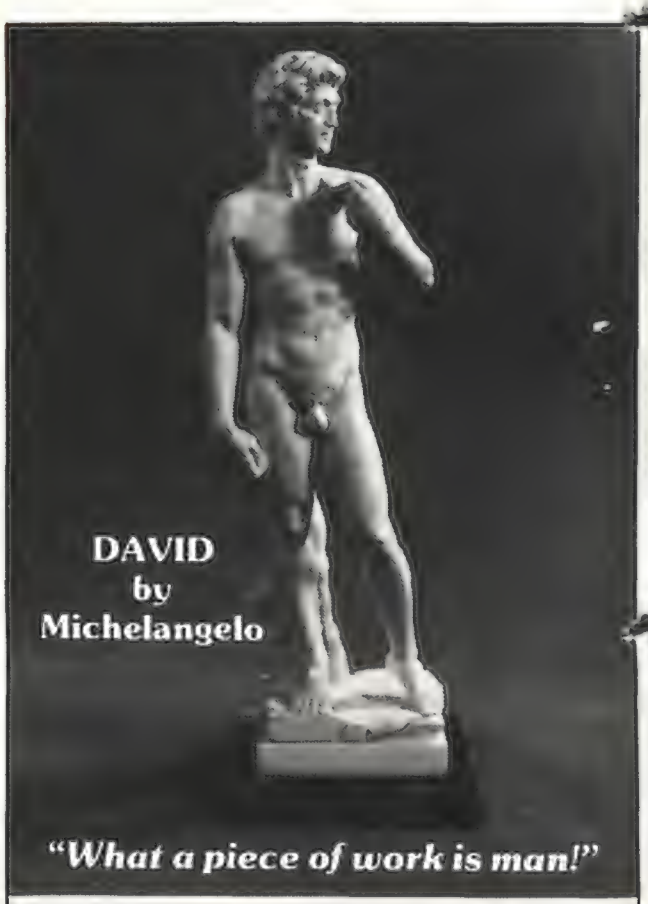

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W. E. Key-nee
Fort Lauderdale

Fanny Van Courtlandt

Dear Sir: In the 1820s my great-grandmother, Peggy Fleming, would attend singing school with her father at the home of Elizabeth Lemert, a widow with six sons. While driving home one night, Peggy's father told her if she married one of those Lemert boys he would give her a cookstove as a wedding present.

The cookstove had been invented in 1812 by J. Low of Massachusetts, but had not yet become popular. It was not until President Franklin Pierce updated the White House sometime between 1853 and 1857 that one was introduced there.

So, in 1828 little Peggy Fleming Lemert, a 19-year-old bride in a little village in Licking County, Ohio, had her cookstove—long before the occupants of the White House had theirs.

Elenore J. Weber
Toledo

Mall

Dear Sir: Edwards Park's remarks revealed his sexist attitude when he observed young men and women at work during his tour of the Smithsonian exhibits destined for the Edinburgh International Festival. He states: "A young man planed and sanded . . ." but goes on to say that "A girl was fitting a sculpture."

The photo of Lora Moran packing the sculpture revealed that she is more than 12 years old and clearly a young woman.

Jean Lee
Annandale, Virginia

Mr. Park, off in Edinburgh, repenting, asked that we assure you henceforth girls will be girls, and women, women. Ed.

Inventors

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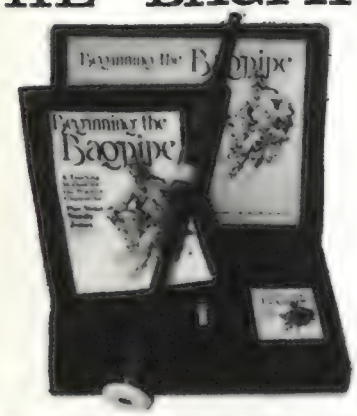

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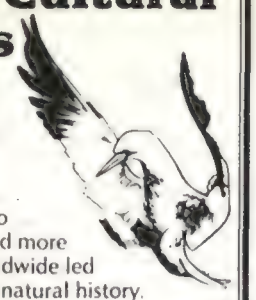

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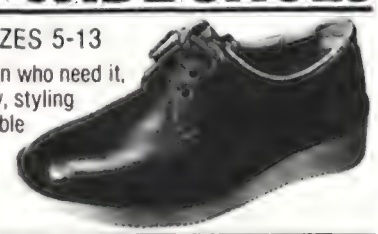

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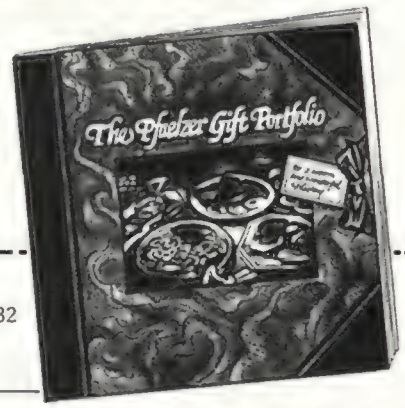

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is. However, you failed to mention that he taught himself to blow glass when he was in his 50s and became one of the first—and is still one of the best—contemporary artists in glass. He may credit the glass with paying for his inventing work (I always thought it was the other way around), but the glass itself should not be dismissed so lightly.

Jane Shadel Spillman
Curator of American Glass
The Corning Museum of Glass
Corning, New York

Dear Sir: I hope that being a successful inventor qualifies me to comment on your description of us as a breed of individuals who are overconfident, arrogant, lonely, paranoid attic dwellers. Having met other inventors, I will concede that some certainly have an overrated self-image. Even I have, on occasion, drawn on napkins. However, many inventors are humble beings who have a strange talent for work, not unlike artists.

Bing McCoy
Vienna, Virginia

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Jack V. Miller
Pasadena

Animals talking like E. F. Hutton

Dear Sir: Surely you have misplaced Noam Chomsky, an illustrious member of the faculty at MIT rather than at Harvard, for whom the educated chimpanzee Nim Chimpsky was named.

Scott G. Davis
Lexington, Massachusetts
Surely. Ed.

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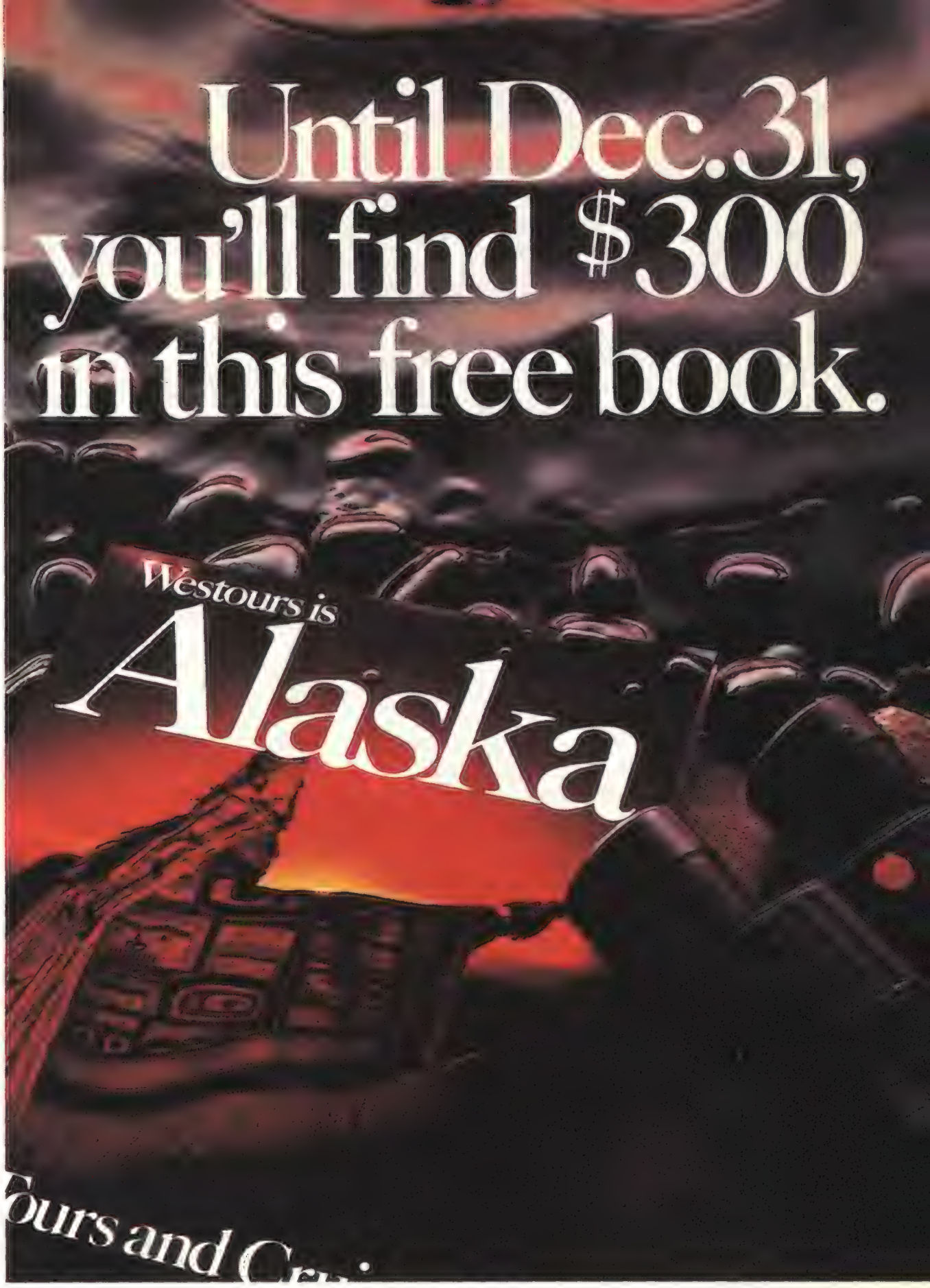

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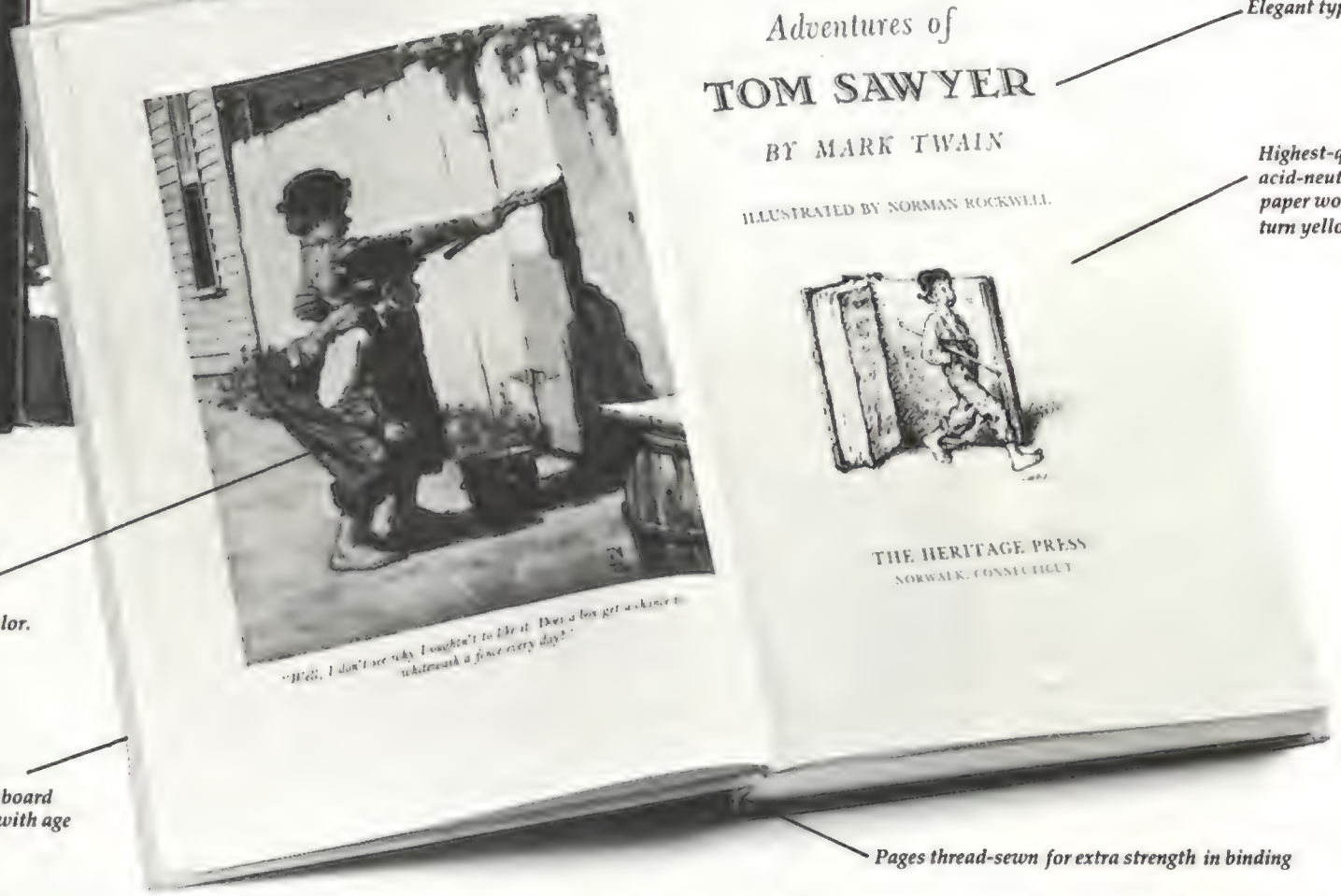

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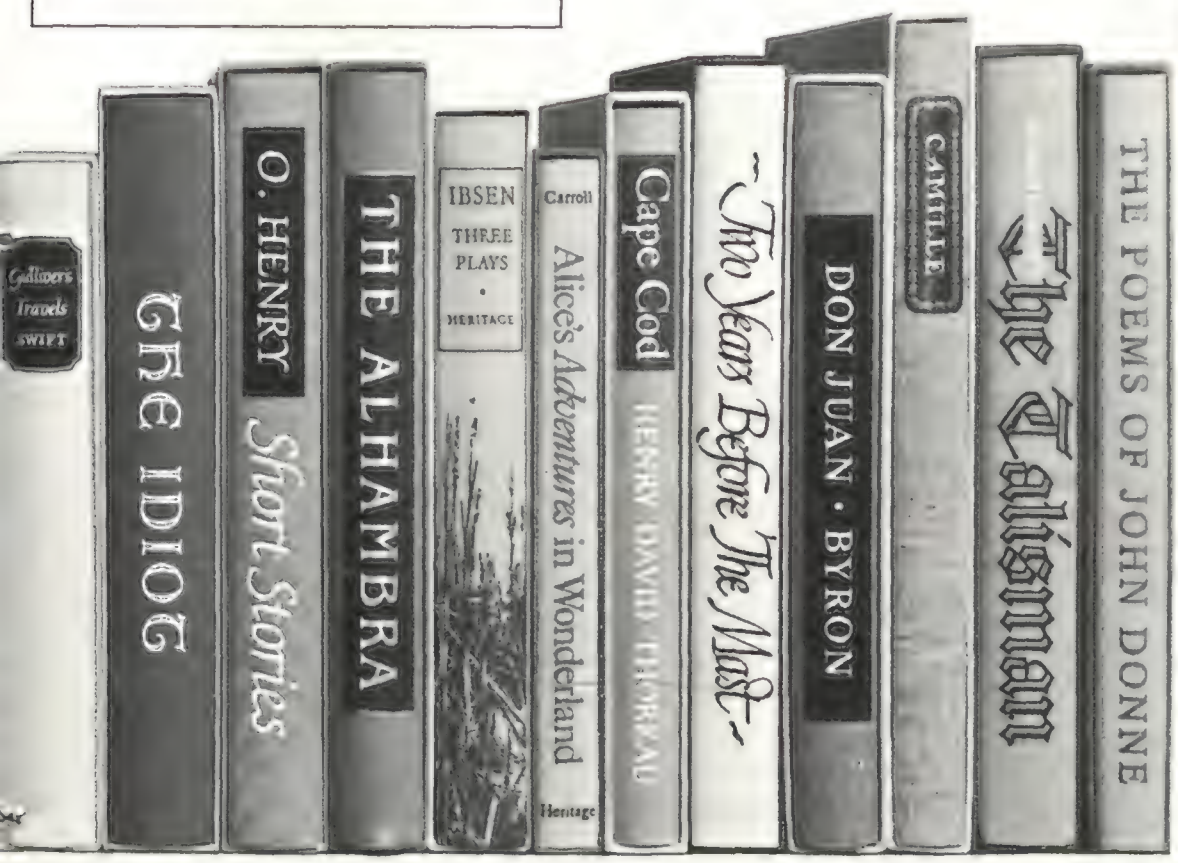

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In front of me as I write is a small piece of wood—a chunk from a log. It's about the same as any other piece of wood, but if you look at it closely, you'll see that it appears to have been squeezed. The tree rings are so compressed that you can't really make them out.

Little wonder. This piece of wood was buried in flood-plain deposits about 29,000 years ago. It showed up again near the floor of the impressive excavation where the new Center for African, Near Eastern and Asian Cultures is being built. It was found beside one of the slurry walls that were described in last June's column, and it had been bearing the pressure of some 60 feet of earth for many millennia.

I was dawdling around as usual when I got a hint that

Excavation foreman Gregory L. Shiley holds the Ice Age log he spotted in hole and saved from being carted off.

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Wolfgang Wagner, grandson and Director of the Wagner Festivals, talking with the artists, about their interpretation of Der Ring des Nibelungen.

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something special had been unearthed, and that I should meet up with a sedimentologist named Jack Pierce, of the Museum of Natural History, and pay another visit to the Big Dig behind the castle. My nose for news twitching at the prospect of a scoop (albeit a 29,000-year-old one), I met Jack and learned that the contractors had found pieces of wood when they were readying the pit for its concrete floor.

Jack and I connected with Charlie Putnam, project manager for the General Services Administration, who had been my guide through the mud-filled excavation last spring. The three of us donned hard hats and wound our way downhill into the pit, which is now as deep as it will get. Downhill was a long way, a meandering descent in the broad ruts made by truck tires in the muddy access ramp. At the bottom of the great hole we found that despite a rain the previous night, much of the sandy and clayey floor was relatively dry. Apparently the system of 17 well points and pumps and piping was doing its job of pumping the water table down below the floor of the excavation. After a run through one of four sediment stations, the water being pumped out was being fed into the city's sewer system. Charlie told us that the basic structure of the Center will have to be finished—roof and all—before these pumps can be turned off. It seems that the building has to be heavy enough to counterbalance the buoyancy force of the water when the pumps are turned off. Otherwise, I guess the Center might just bob up and float away down Independence Avenue.

Four inches of concrete had already been poured on part of the floor of the excavation; Charlie called it a mud slab or working mat. The three of us stood on this concrete platform for a moment, taking in all that Man had wrought here. Around us were towering walls, the slurry replaced by concrete, the tiers of tiebacks protruding as they held the great cliffs secure against the enormous pressures of the world outside. I felt the same sense of exclusion from ordinary life that has struck me on the floors of deep Southwestern canyons. The familiar environment is gone. Sounds, climate, even attitudes are different. As we passed workers, we instinctively smiled and spoke, and so did they. All of us were exclusive. We shared a strange world.

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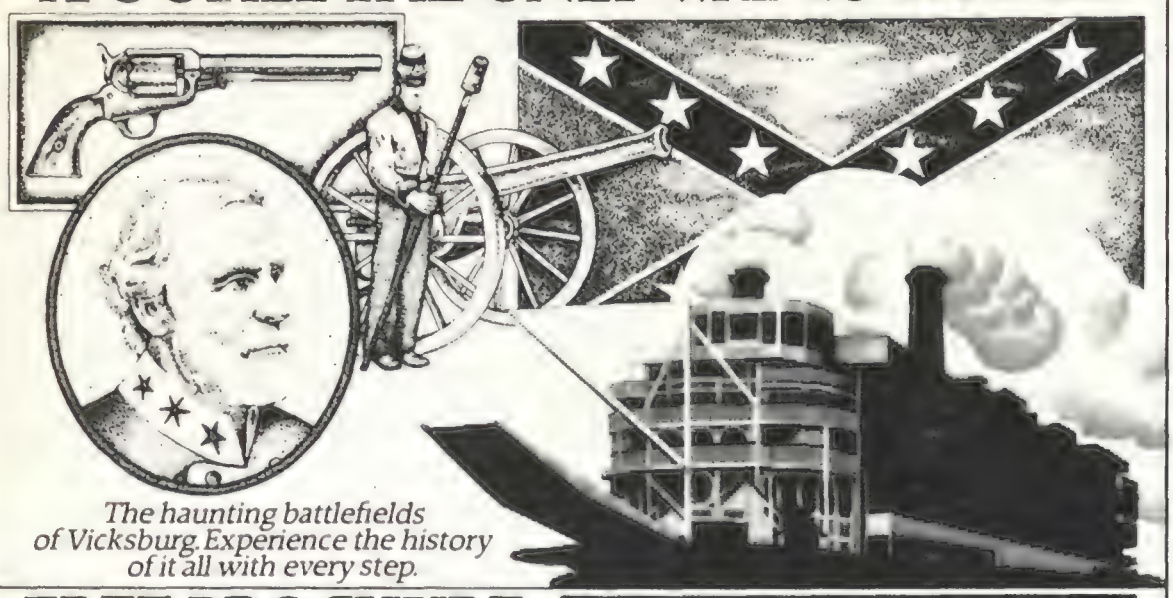

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Charlie said. Jack and I were not surprised to hear that.

Three rectangular pits, all filled with rainwater now, had been incorporated in the concrete slab. The big one would take two hydraulic elevators; the smaller ones were just two of a number of ejector pits where groundwater will gather and be pumped out.

Charlie showed us rows of reinforcing rods in the concrete perimeter wall—slight indentations called keyways marking where the floors of the Center will tie in. At the base, 42 inches of concrete will form the massive mat foundation upon which the whole structure will rest. On top of that will go 18 inches of gravel containing a system of drainage pipes that will be hooked up to the ejector pits. Then comes a six-inch concrete slab, the bottom floor of the Center—the one we'll actually use.

We asked how the ramp would be excavated, and he said that backhoes and a crane would do the job, but that tiebacks would have to be installed in the concrete walls now covered by the ramp as it was excavated. The huge drilling rig used to install the tiebacks might just have to be lifted out in pieces, he said.

The fascination of the project so gripped me that I was almost surprised when Charlie gestured toward a dingy brown slab of wood resting on the concrete. It wasn't exactly an eye-catcher. It didn't gleam with rainbow colors like the fossilized trees at the Petrified Forest. It just looked like a piece of wood (it *was* still wood), rounded slightly on one side, flattish on the other, as though it had been split away from a huge trunk (p. 27).

Not so, said Jack. It's a complete log. And to prove it, he turned it endwise so we could see the heart of it, where the rings begin. Pressure had squeezed it into that odd shape. The top is flat because it was covered from above by a hard, resistant material; the bottom is faintly rounded because it lay on a more pliable material. This was the way Jack pictured it, and Charlie was able to substantiate the theory:

"See that blue-gray band along the wall near the bottom of the dig? Well, that was a layer of clay. Then above it is reddish gravel. We found the log just where the two come together."

"Sure," said Jack. "The log would have sunk in still water—a backwater of the

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Potomac. It lay on the bottom and was quickly buried by sand and gravel."

He fondled the log, rubbing gently the damp wood, which was the color of teak. "Bald cypress," he said. "It would have been about 15 inches in diameter. The lab people could still make out the cell walls in the sample they were given. They gave it an age of 28,770 years, plus or minus 590. Let's call it 29,000 years—the beginning of the last Ice Age. The wood is preserved because it's been completely deprived of oxygen. Now a fungus will probably attack it, and it'll rot."

He bent suddenly and picked up a small gobbet of clay; then carefully broke it apart in his fingers. "Leaves," he said. "You can see the needles. Here, have some 29,000-year-old leaves." He handed the thing to me.

"What kind of leaves?" I asked.

"I don't know," Jack said. "I'll ask a leaf man, a paleobotanist. I'm just a dirt man, myself."

Jack was pleased to find these dark globs because previous testing of the blue clay had revealed nothing of interest. He asked about the trickles of water seeping down the pit walls from about the 30-foot depth. Charlie said this seepage was just a combination of Potomac water and a wet summer. The Potomac drops little between Washington and the Chesapeake Bay, so in earlier times its meanders formed random basins and backwaters. They were filled during the growth of the city, but left their marks with wet strata such as these, bands of clay and gravel.

As we started climbing out of the excavation, one of the workers handed over another small chunk of wood that he had just found. Jack and Charlie gave it to me. I held it and rubbed the smooth grain, and then sniffed it. Absolutely no smell. I was struck by the paradox: wood from the last Ice Age, so old it doesn't even have a smell, making room for a 21st-century cultural center.

Exactly ten years ago, another cultural center opened in Washington. The Hirshhorn Museum and Sculpture Garden, the capital's first major collection of contemporary art, opened its doors early in October 1974, and now celebrates the anniversary with a big new exhibition drawn from almost a hundred museums, galleries and private collections in Europe as well as the United States. The pieces on display will not be limited to

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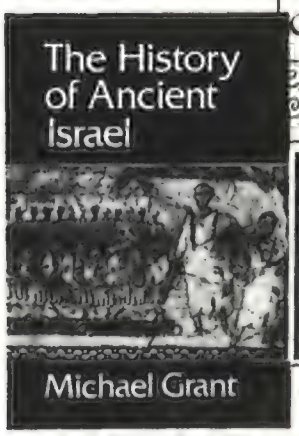

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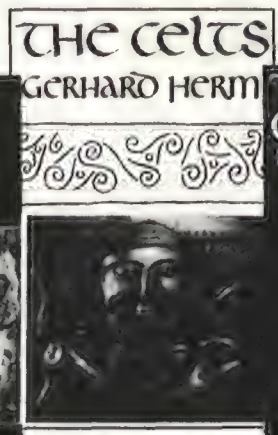

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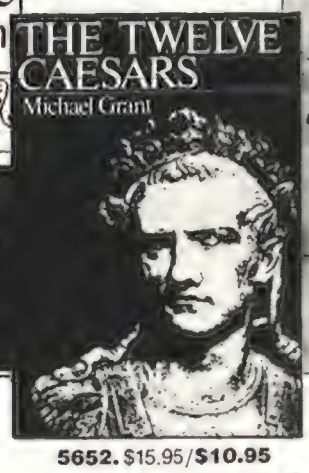

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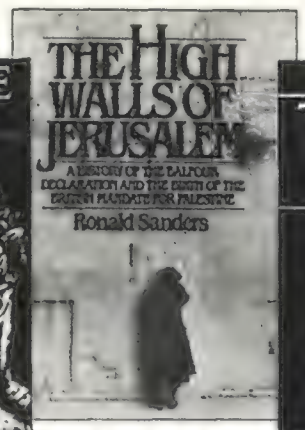

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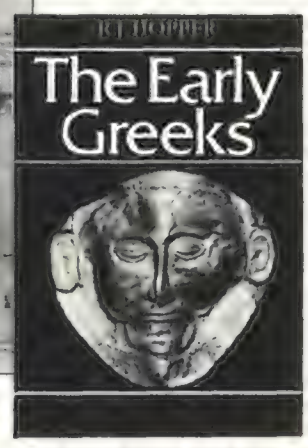

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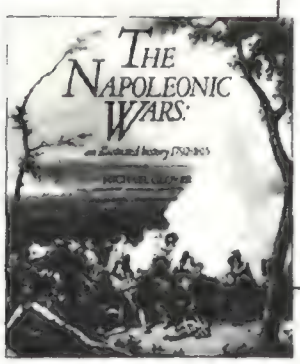

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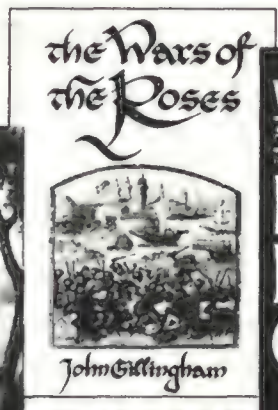

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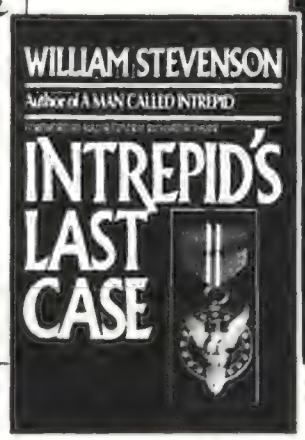

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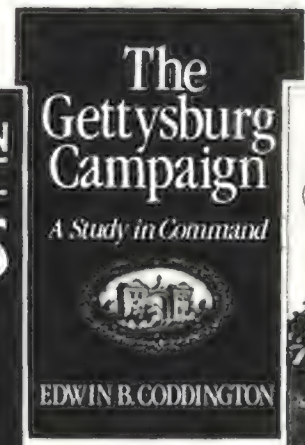

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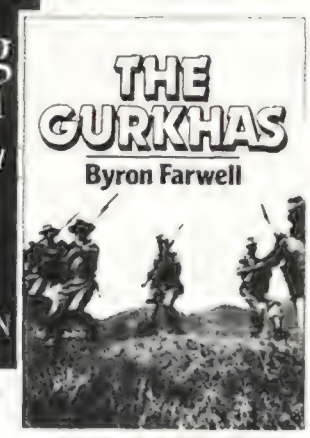

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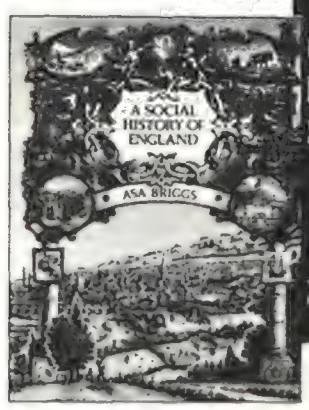

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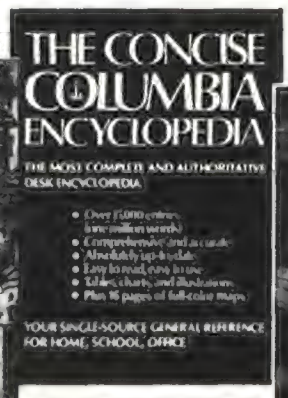
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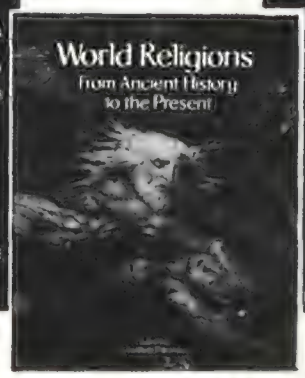

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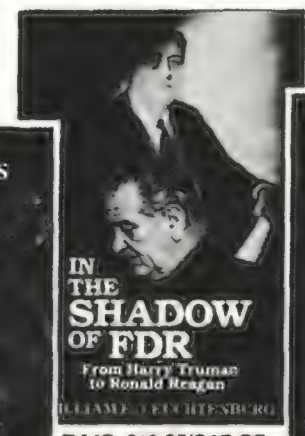

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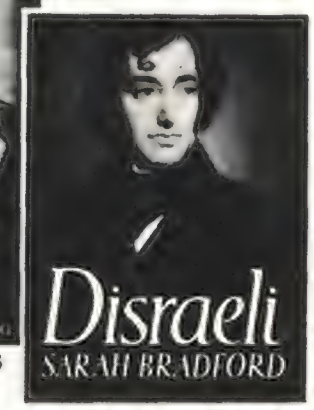

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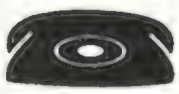

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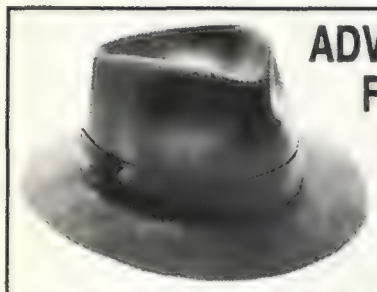

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paintings and sculptures. There will be photographs, film, installations that incorporate video and neon, even recordings of songs, for the idea is to show what has been going on in art, in the broadest sense, since the Hirshhorn opened. Every display dates from within the museum's decade of existence.

It all sounds like rather chaotic good fun for a birthday party. But the organizers, associate curators Howard Fox, Miranda McClintic and Phyllis Rosenzweig, stoutly maintain that there is a real theme to the show. It's that art since 1974 has begun to concern itself more with "content" than with innovation in style. Content means, roughly, "meaning."

And all the time, for me, at least, there will be memories of Hirshhorn shows of the past ten years: "The Golden Door," which opened in 1976 and was about American immigrant artists; Winslow Homer's drawings (also 1976); "The Animal in Art" (1977); Henry Moore's sculptures (1978) and "Calder's Universe" (1979). I remember two particularly fascinating shows in 1980: one showed the work of the early 20th-century Russian avant-garde, the other showed a German-born artist's impression of the fighting at Stalingrad during World War II. And then there was the more recent De Stijl show, and Red Grooms, and David Smith, and The Eight. . . . Those are just ones I happened to see and like.

I *am* an authority, however, on parties, and on this tenth anniversary I can't help thinking back to the one that took place when the Hirshhorn was born. Artists showed up, sometimes dressed like artists, and notable nonartists arrived, also sometimes dressed like artists, and an orchestra dressed in tuxedos played by the fountain in the courtyard so people could dance. But it was the coldest October first you ever heard of unless you came from Yellowknife. People danced in overcoats if they had them, or very fast and hard if they didn't. The thermometer went down into the 20s, and I asked the bandleader how it was the musicians didn't freeze, just wearing tuxedos.

He tapped his shirtfront with his baton. "Long woollies underneath," he said. "We're all wearing them."

Never mind. Ever since that frosty night the Hirshhorn has proved to be a very hot property.

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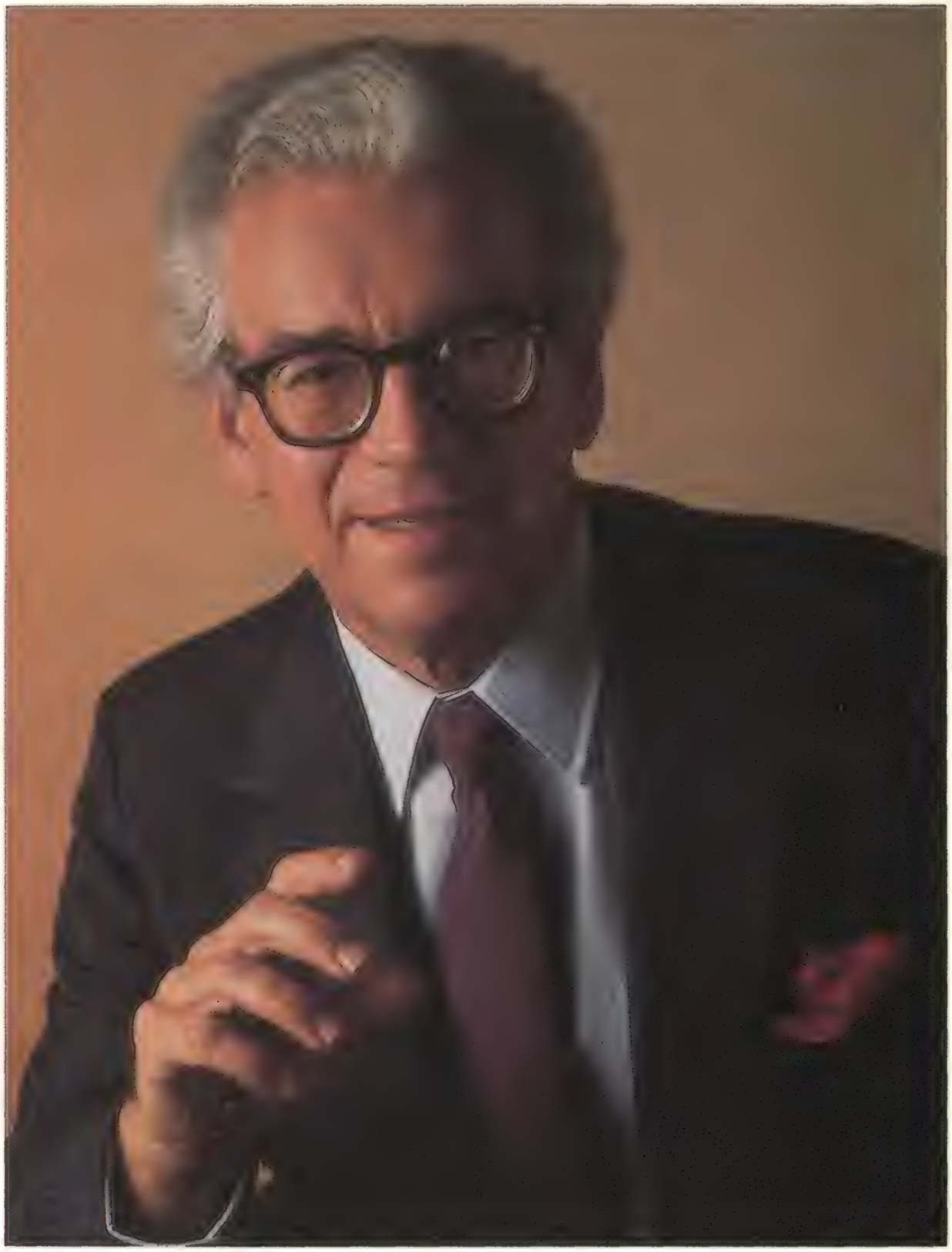

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S10

Phenomena, comment and notes

Learning to catch wildlife by throwing stones may have given our ancestors the capacity for language and culture

Little did I know when I wrote about baseball last month that I was on to something big. Something bigger than the Great American Pastime (see page 152 of this issue), bigger even than all of Western civilization. It may be that it was learning to throw, rather than language, that led to the explosive increase in hominid brain size that made us what we are today.

Those early people were not playing; throwing rocks at rabbits and small birds, they were the first predators able to strike at a distance. For a person who had learned to throw, it took a lot less time and energy to brain a rabbit with a rock than to chase it down. But throwing is a surprisingly complicated task, a tight sequence of muscular activities, and the rock has to be released at just the right millisecond if it is to hit its target. That kind of coordination calls for increased brain capacity.

The whole idea is the work of William H. Calvin, an associate professor of neurophysiology at the University of Washington in Seattle. He expounds upon it in a recent book of essays entitled *The Throwing Madonna*, explaining along the way how throwing made it possible to colonize colder climates and why nearly 90 percent of us are right-handed.

Hunting with rocks is not new to me. I was appalled on my first few outings as a Scout leader when I realized that the reaction of my young charges to seeing a turtle or a duck on the water was to stone

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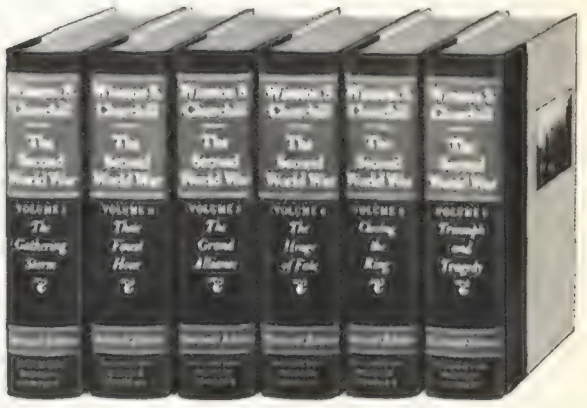

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it to death. But maybe they still knew something I had forgotten and were exercising a skill that has been fundamental to our evolution.

The conventional explanation of the sudden increase in hominid brain size is language: hunters needed to communicate to coordinate their attacks on large animals such as mammoths, and a larger brain was needed to make language possible. Calvin argues that it was the sequential skills and coordination developed in *throwing* that subsequently made language possible. He suspects that early Man ate more rabbit than mammoth.

Calvin says the ability to throw could have evolved in this way. Present-day chimpanzees will pick up a rock in both hands, raise it over their heads and then throw it down on the head of a dead monkey, trying to crack the skull so they can eat the brains. If the monkey were not dead but were still thrashing around, the chimpanzees would not have wanted to get too close. And once they learned to throw from a distance at an already wounded animal, it would be only a small step to throwing at a still-healthy animal.

Throwing a big rock with both hands makes for a very limited range. But you don't need a big rock to accomplish the goal. A smaller rock thrown at higher velocity will do just as well. The kinetic energy involved is indeed proportional to the mass of the rock, but it is also proportional to the *square* of the velocity. Tripling the speed gives you a ninefold improvement in stopping power. And the higher the velocity, the greater the range.

The way to get velocity is to throw with one hand. It is the sequential snapping of shoulder, elbow and wrist that gives a fastball its hop—or a rock the momentum to knock down a rabbit. Calvin suggests that learning to throw with one hand produced the very first lateralization in the human brain, the first concentration of a function in one hemisphere. Language skills would be lateralized too, but not necessarily first. The concentration of both is most commonly in the left hemisphere.

Patients with left-hemisphere strokes, Calvin says, have trouble with sequential movements. They have trouble opening a door, for example. They can fit a key into the lock, they can unlatch chains, they can turn the knob. What they cannot do is take these steps in the right

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order. Even though their facial muscles are not paralyzed, they cannot act out a sequence of facial expressions. And language is more clearly located in the left hemisphere than any other function. For every 14 people who suffer language impairment, 13 will have left-brain damage.

Sequencing is the key, Calvin suggests, to that first lateralization. And learning to throw stones would have offered an immediate major payoff—a better chance at survival for you and your offspring. The faster you can throw, the better. The animal you have stalked will have had less chance to move. You can throw from farther away. And the faster the throw, the greater the stopping power.

Faster throwing, however, is a much more difficult task for the brain. You have to let go of the rock at just the right instant or you will miss. The faster the throw, the shorter the "launch window." Yet the farther the target, the faster the throw must be. According to Calvin's calculations, the launch window is about one two-hundredth of a second for a rabbit one car length away. For a rabbit only twice as far away, the window shrinks to one sixteen-hundredth of a second.

Language is obviously important, Calvin concedes, and most certainly would have helped hunters corner a mammoth. But what, he asks, rewarded the intermediate steps that came before that level of speech? The muscle sequencing that would make language possible later on would have made enormous changes immediately. The ability to hunt by throwing rocks would have conferred an instant advantage. Once confined to the tropics, where they could live on fruit and nuts and occasional meat, our ancestors could now live almost anywhere that small animals lived: on the plains, in the woods, in colder climates, in warmer ones. Being able to kill animals at a distance would have meant a new ecological niche, Calvin says, and the "traditional reward for the species that discovers a new niche is a population explosion."

Calvin argues further that the right half of the brain would enlarge symmetrically along with the left. The space corresponding to the left-side muscle sequencer would be sitting there, "like an unfinished basement," waiting to be put to use. And if the right brain found a visual-spatial use for that space, say improved depth perception, then that too would have had an immediate payoff in

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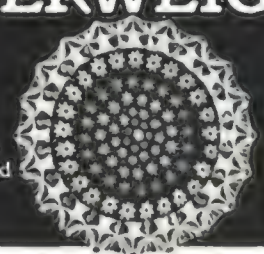

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better hunting. "So perhaps," Calvin says, "the lateralization of throwing was what started the rapid enlargement of the brain. And perhaps 'throwing genes' are little more than bigger-brain genes."

The lateralization is not random. Nearly 90 percent of us today throw with our right hands, and Calvin thinks that that preference may have appeared early. For men it would have made no difference which arm they threw with, but for women it would have. Consider a hungry mother, trying to get close enough to a rabbit to brain it. She is carrying an infant with one arm, leaving the other arm free to throw a rock. To keep the baby as quiet as possible, she will carry it under her left arm, where it will be soothed by the beating of her heart. The heart is pretty much in the center of the body, despite what most of us have always believed, Calvin concedes, but the left ventricle operates at much higher blood pressure and makes more noise than the right.

Here natural selection takes over. The mother better able to throw with her right arm will bring down more game, feeding her offspring as well as herself more successfully. Her success is no small matter, as we are coming to better appreciate how much of the total food supply came from the hunting as well as the gathering done by women.

Calvin does not offer his theory as the ultimate. "Undoubtedly," he says, "humans are the outgrowth of a whole series of selective pressures which forced our predecessors to learn to eat new foods, live in new habitats, develop new reproductive strategies such as kinship. Each Ice Age has probably left behind a residue of skills which, like the boulders scattered across the landscape, remain after the vicissitudes have vanished."

But he certainly sees the possibilities. The same rapid-movement sequencer in the left brain could have gone from throwing to talking to chipping rocks into scrapers and knives, incidentally providing the sparks that made possible fire on demand. And more: ". . . besides explaining minor things, such as how humans got started and what made book-learning culture possible, the throwing theory even reveals the true origins of baseball, establishes it as the most elegant of all sports, the fastball as the most fundamental of inventions. . . ."

A theory that does that can't be all bad.
John P. Wiley jr.

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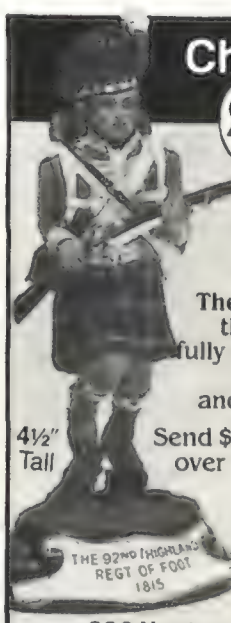

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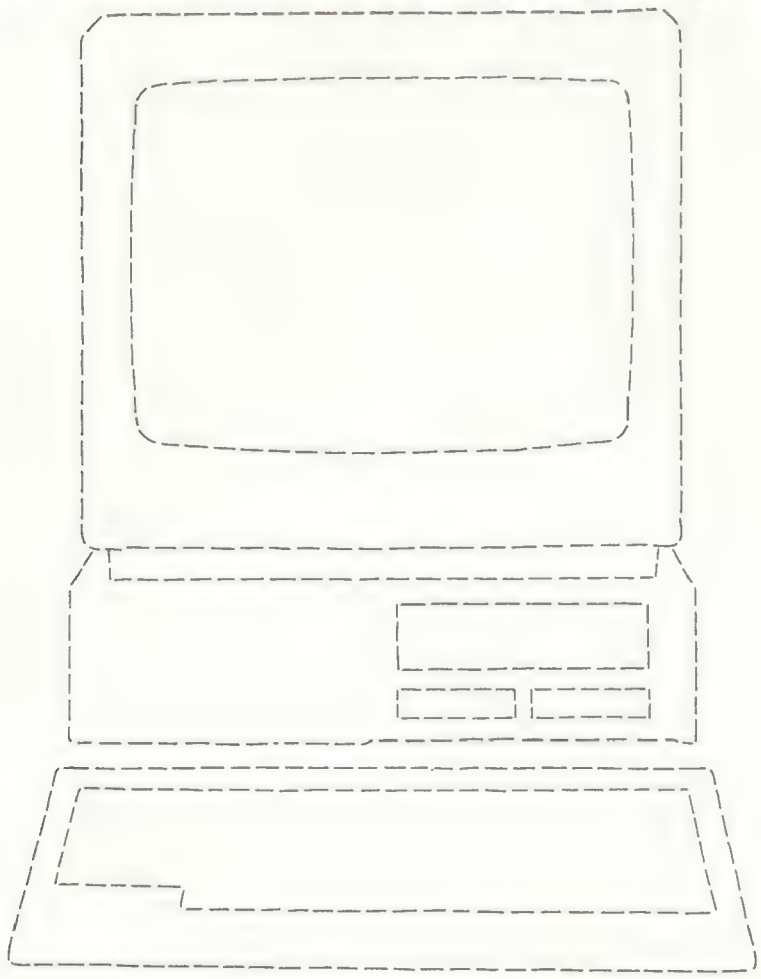

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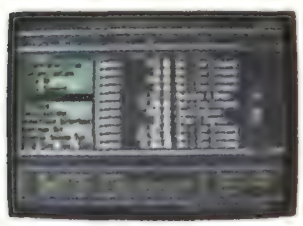

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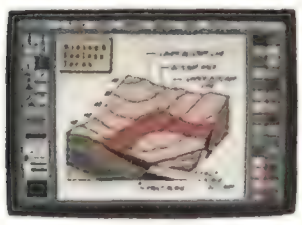

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PC*jr*'s new typewriter-style keyboard adds a nice touch to business, home or educational computing.

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By Michael Parfit

The Last Continent

First of a two-part series

Antarctica today is ruled only by the laws of science,
but governments are watching what happens on the ice

At the edge of glacier draining King George Island,
cliffs of calving ice form a typical Antarctic coastline.

Mount Siple was out of place. It had crept up from under the iceblink in the sunlit night like a huge stone ghost, 9 miles southwest of where the chart said. That didn't matter to J.D., the man who had put the sign over the door of the pilot house: "No QUICHE served on this bridge." Nothing bothered J.D.: when a tabular iceberg the size of Manhattan loomed, with its cliffs of beautiful, sinister, pale blue, the color of thoughts of the bottom, J.D.'s enthusiastic tenor would sweep the bridge, driving fear away before it. "There it is, gentlemen. Death Ice ahead."

The first landing—ever—by humans

Now J.D.—Lieut. James Dale, operations officer of the Coast Guard icebreaker *Polar Sea*—was giving the flight briefing before sending the scientists off by helicopter to put the first human footprints on the little elbows of black rock we could see sticking out of Mt. Siple's cloak of ice, and he didn't mind the false assertions of the chart. The U.S. Geological Survey people were already fixing it with pencils. What mattered was that we could see Mt. Siple rising up into the clouds, as had no earthbound soul before us, and it was now our privilege to pin down an unknown part of the world and to introduce it at last to our civilization of helicopters, boots, maps, photography, satellite positioning, walkie-talkies, the geologist's hammer and, inevitably, politics.

"Green light, gentlemen!" J.D. said happily. "No prisoners!"

What was happening at Mt. Siple was a lot like what is happening today to the entire continent of Antarctica. Like Mt. Siple, Antarctica is misplaced in our minds: it has been a white lower border on maps otherwise saturated by the colors of national sovereignty. It has been cloaked in myth. It has been hidden by clouds of false hopes. To Aristotle it was the unknown but logical balancing continent of the Earth. To an 18th-century French explorer it was a lush green dream called South France, a place promising to "furnish marvellous physical and moral spectacles." Only a few years later it became the utterly forbidding ice coast described by its first circumnavigator, Capt. James Cook: "I can be bold enough to say that no man will ever venture farther than I have done. . . ." It is in truth none of those things. The reality of Antarctica is being put together, piece by piece, and now, after three-quarters of a century of this assembling of varied detail by adventurers, scientists and politicians, Antarctica—whole—is about ready to join our world.

Although on some distant day this land may offer shiploads of ore, seafood or oil, Antarctica's uniqueness may surpass all those more tangible assets as its greatest gift. From space Antarctica is a beacon, shining out past the moon like something young on the face of the ravaged Earth: 5,400,000 square miles, 98 percent covered in ice an average of a mile thick.

Hove to near Siple Island, the U.S. Coast Guard icebreaker *Polar Sea* carries scientists and surveyors.

On Earth the continent may soon appear in headlines in less luminous circumstances. Some think the Falklands war was fought over Antarctic resources—a disputed theory—and this autumn may see more acrimonious debate about Antarctica in the United Nations. At the same time, the 16 nations that make up the consultative parties of the 1959 Antarctic Treaty are struggling to find a way to license and regulate mineral development—if it occurs—without upsetting the delicate political balance between nations that claim part of Antarctica and those that recognize no claims, and the even more delicate environmental balance of the continent itself. But all this old-fashioned conflict may be misleading: on the evidence of some of the assembled details it seems possible that Antarctica, the seventh and last continent to come out of legend, will give us something entirely new. That, perhaps, is promise enough.

"What goes on north of 60 degrees south is the odd

The author, a free-lance writer whose work often appears in SMITHSONIAN, *spent four months in Antarctica between November 1983 and April 1984.*

The ship can move through this ten-foot-thick ice continuously, without having to back up and ram.

At Amundsen-Scott South Pole Station, a civilian worker talks via ham radio with friend in the States.

man out," John Heap likes to say. Heap, the head of the British Foreign and Commonwealth Office's Polar Regions Section, frequently wears the smile of someone sharing a delightful secret. The secret is that he often looks at the Earth from directly above the South Pole. From there, he points out, one notices that what matters consists of Antarctica and the Universe.

From that perspective you notice that the first raw truth of Antarctica is its size. Trying to get a grip on this bulk, some Westerners have called the Antarctic landmass the size of the continental United States plus Mexico, which is too small, or the United States plus Europe, which is too large. This 5,400,000 square miles of ice-covered land is actually about the size of the Soviet Union minus the United States, a comparison not often made.

In talking about the influence of the continent, however, one must at least add the fluctuating area of sea ice, which grows and shrinks mightily with the seasons and at times extends north past the 60-degrees-south line of latitude that forms what might be called the political boundary of the Antarctic region as drawn by the Antarctic Treaty. Even that is not the ultimate dimension of the Antarctic region. The most realistic boundary is the edge of the Antarctic Convergence, where the ice-chilled water of the Southern Ocean slips

McMurdo Station is United States' main Antarctic base; flags serve as location markers when blizzards hit.

By 1984, the number of year-round scientific stations had grown to 52, representing 14 nations. They range around the entire coast, with several in the interior. Heaviest concentration is on the Antarctic Peninsula.

beneath the warmer seas of the rest of the world. Although the water submerged here slides on north, spreading cold fingers even into the Northern Hemisphere, the convergence is a true natural edge, where wind, sea, life and the taste of the air change.

For those more accustomed to the Northern Hemisphere, this seems a vast zone of influence indeed: it corresponds to most of the area north of a line around the world drawn approximately through Frankfurt, London, Quebec, Vancouver, Northern Manchuria and Kiev. Some balance, Aristotle.

"Antarctica is a continent of superlatives," Walter Seelig of the National Science Foundation told a small group of southbound journalists in a little blue Navy chapel in Christchurch, New Zealand. Antarctica photographs lined the walls like stained glass. "It's the coldest, windiest, highest, driest." I was among the journalists, beginning a journey that eventually lasted four months, included various adventures and a brush with a surprisingly virulent Antarctic danger—fire—and at length brought me to Mt. Siple.

Residents of McMurdo Station, the U.S. base on Ross Island, like to talk of living On the Ice. That's hyperbole, too, because McMurdo is solidly built on black volcanic rock. In summer (October through February), McMurdo is a mad jumble of people, buildings and the noise of Bell UH-1N helicopters. Its population wavers around 1,000, an amalgam of Navy pilots, mechanics, administrators and builders, civilian workers hired by the National Science Foundation's support contractor, and scientists with their graduate-student assistants.

"Welcome Aboard McMurdo Station's Trans-Antarctica Railroad" reads a sign on the cargo depot, and McMurdo does have the air of an Old West train town. It's the semipermanent camp in the mountains

at the end of the line, with its buildings on frost-defying stilts, its hills bulldozed for gravel and covered with fuel tanks, its acres of stacked junk, and its transients packing gear and studying maps and going out to find the gold. Except that here, as it is all over Antarctica for the time being at least, the gold they seek is knowledge.

Out at Mt. Siple, the first person off the helicopter to put his foot on the previously unexplored outcrop was a Coast Guard crewman. The second was a geologist, Wes LeMasurier of the University of Colorado at Denver. That's the way it has always been in Antarctica. Although the first American to see the continent was an adventurous sealer named Nathaniel Palmer, sailing in a 47-foot sloop named *Hero*, virtually all serious exploration has been done for science.

Lugging geological samples—even to the death

Even the legends of Antarctica are entwined in science. Robert Falcon Scott and his companions, coming back from the South Pole after having lost the race to Roald Amundsen, lugged 37 pounds of geological samples all the way to their deaths. Sir Douglas Mawson of Australia, whose terrible trek in 1911 is less famous than Scott's only because Mawson had the poor sense to live through it, was himself a geologist. The continent's history is full of feats of endurance and suffering carried out for science, but the most eloquent case for the bond that in Antarctica seems to link adventure and science was made by Apsley Cherry-Garrard, a member of Scott's expedition, who undertook what he later called "The Worst Journey in the World" to recover Emperor penguin eggs, which are incubated in the harsh winter darkness.

"And I tell you," he wrote, "if you have the desire for knowledge and the power to give it physical expression, go out and explore. . . . You will sledge nearly alone, but those with whom you sledge will not be shopkeepers: that is worth a good deal. If you march your Winter Journeys you will have your reward, so long as all you want is a penguin's egg."

Over the years the men and women who have gone to Antarctica have pursued that reward so consistently that the first strikingly different thing about this place is that it is the only continent where human foundations of history and culture are all being built neither by religion nor conquest nor politics but by science.

"Mushrooms," the scientist's voice said faintly. We strained to hear. The voice in the radio became more urgent: "I said mushrooms!" It was the little room that housed the radio transceivers collectively known as Mac Sideband. Lacy orange curtains shaded the room from the constant sun. On shelves were stacked rolls of military Type 1, Class 2, Grade B, three-copy canary teletype paper. Two conversations were going, one between McMurdo and Christchurch in regard to the purchase of a 300-baud computer modem, the other between Shaunessy Everett, an employee of the civilian contractor, and the science crews who were living in tents and the insulated canvas huts known as Jamesways all over western Antarctica. Communications were good but not perfect: one of the crews, two women camped out to do geological mapping at a desolate place called Helms Bluff, had been ordering up items for the next regular helicopter supply drop. The urgent mushroom message was in answer to Everett's question: Did you really say you wanted four cans of hot mustard?

Daily comms, as they were called, were seldom profound; their main purpose was to make sure everyone was alive. But for that hour and a half each morning, Mac Sideband became a symbolic gathering point in the U.S. portion of the web woven by science across the continent. Like a hen counting her scattered brood, Everett called the science groups one by one and got food orders, announcements of camp moves, logistical requests, reassurance.

"Hi there, Shaun, we're all fine here. How are you?" It was Donald P. Elston, a weather-beaten geologist who is so friendly and articulate that he is frequently called away from his work to escort DVs (senators, congressmen and other Distinguished Visitors) around the dry valleys in helicopters. Living in yellow-and-orange tents on a field of glacial debris strangely divided into huge polygons by frost, Elston and an international crew were drilling one of several 200-foot-deep holes and pulling out cylinders of rocks

Adélie penguins are among the estimated 100 million or more birds that breed in the Antarctic each year.

In a bay of Antarctic Peninsula, scientists scan the water for two-inch crustaceans known as krill.

and gravel glued together by ice. The joint U.S. and New Zealand project (international cooperation is typical of Antarctic science) was aimed at understanding the area's glacial history by looking at deposits that late Pleistocene ice flows had left in the valley, "trying," Elston had said, "to get a handle on that part of the elephant."

The next call was from the Roaring Valley, a name that can refer only to wind on a continent that is otherwise silent. There a group called Sierra Zero Seven Five, from Northern Illinois University in DeKalb, was studying ancient bits of the Earth's crust embedded in younger rocks. Patterns of rocks and fossils studied by several investigators in recent years —including a fossil marsupial, found in 1982—strongly support the idea that Antarctica was once the central mass of a continent scientists have called Gondwanaland, which broke up into Africa, South America, Australia, India and other fragments. At least one person who subscribed to this theory posted a sign at the South Pole that bore the slogan "Reunite Gondwanaland," but Sierra Zero Seven Five wasn't being political. Some of the rocks it studied resembled those found in Australia, so the goal was a deeper understanding of how the continents had once been linked and later parted.

After the faint scratchings of teams calling from

South Pole scientist gets data from telescope.

Ed Zeller examines a rock as part of radiometric survey.

Research assistant weighs a Wilson's storm petrel.

An automatic station keeps track of weather.

Though vital to the Southern Ocean's food web, they are increasingly being fished by several countries.

the nearby dry valleys, the voice of Robert Bindschadler of the National Aeronautics and Space Administration, one of a group studying another part of the great white sliding skin of Elston's "elephant" 700 miles to the southeast, nearly blew Everett's ears off. There were no mountains around Bindschadler to break up the transmission: he was genuinely on the ice. He was camped near an area called the Siple Coast, which, with a thousand miles of ice plateau to the east and the Ross Ice Shelf (about the size of France) to the west, looks about as coastal as a North Dakota winter prairie. His group was among six studying what has become one of Antarctica's glamour issues, the West Antarctic Ice Sheet.

If this ice sheet were suddenly removed, much of what it covers would be below sea level, so the sheet in effect is resting on the seafloor. This is thought to make it less stable than the larger East Antarctic Ice Sheet, whose foundation is higher. Geological history indicates that the western ice has fluctuated widely; if it were to fluctuate soon by sliding off into the sea, it is so enormous that worldwide sea levels could rise 20 feet, forcing much of civilization to flee for higher ground. This is not a big-splash problem; even the most dramatic scenarios call for Act I to run at least two centuries, but since the ice sheet's fate may be linked to very small temperature changes caused by the carbon-dioxide greenhouse effect we have been hearing a lot about lately, and since many other global effects attend even a few inches' change in sea level, the West Antarctic Ice Sheet has become, relatively speaking, hot news.

Bindschadler and his crew were out at one of several streams of ice that flow through the sheet a bit like rivers, a bit like ocean currents and a bit, one scientist said, like gravy on mashed potatoes. Each is 20 to 30 miles wide and moves up to a half mile each year—fast, for ice. Ice streams are the drains for the ice sheet, so they're the key to whether the whole thing is pouring away. The work consisted of planting flagged bamboo stakes in perfect circles on the ice streams to measure the stresses going on in the ice by how the circles bent. The human stresses were not insignificant: ice streams almost by definition are sown like minefields with crevasses that can eat you alive.

Team monitors dives of a Weddell seal.

Fish is studied for antifreeze in its blood.

Tim Targett seeks ways to tell age of cold-water fish.

Eppler and Malin analyze erosion in dry valleys.

As part of a survival course, scientist fits final snow blocks into an igloo; later he will sleep overnight in it.

None of the scientists at work on this question would venture a resounding prediction on the ice sheet's future. "It's a very real possibility that it might collapse," one of Bindschadler's colleagues, Jay Zwally, also of NASA, had said. "But we don't even know what it's doing right now."

The West Antarctic Ice Sheet project was part of a trend in Antarctic science away from historical efforts to include as many of the disciplines and areas as possible in order to get a broad picture of Antarctica. "I think the tendency is away from this eclectic approach of doing a little bit of everything," said Dr. James Zumberge, president of the University of Southern California and of the Scientific Committee on Antarctic Research, the international organization that facilitates overall science planning for the continent. "When we knew so little about the continent that was a good approach. In the past ten years one has seen more concentration on larger projects in greater depth."

Most scientists anywhere would say that science itself is an adventure, a dramatic advance into the unknown. In Antarctica this sense is pronounced because the adventure is also physical. New Yorkers may not get excited about future worldwide flooding, but for Bindschadler and his colleagues, out there in the polar wind with thousands of feet of ice creaking away under the Jamesway, and the crevasses glowing blue like carnivorous flowers under white snow camouflage, life has edge. Unexpected death is not a stranger to Antarctic science, and the risks are not hidden: an uncomfortably large number of the buildings and facilities at McMurdo are named for those who died here, and crosses stand silhouetted on the black hills.

Taking the danger and the discomfort of fighting the aggressive cold in stride itself adds zest to the work. William David Johnson, one of LeMasurier's geologists, spent part of the season rock climbing for samples not far from McMurdo, on a cliff from which rocks fell constantly. "You'd hear a low humming noise," he remembers. "You knew it was a rock, so you'd duck, and then the rock would come over like a flying lawnmower blade, end over end, and would explode down below. It was geology in action. We did get some very good samples. That was the thing."

Sometimes it seems that the ice is littered with the wreckage of aircraft—a misconception caused by continued flights over routes that previously claimed victims. But like the memorial names on buildings, the aluminum carcasses point out that the scientists aren't the only ones to embrace the adventure of working in the Antarctic—air crews do, too. They are at the heart of the enormous logistic effort that supports the science. They're Navy pilots who normally fly jets, helicopters or transports in endless war-game sorties. Suddenly they're thrown into a world in which the hazards are not artificially induced, the goals are not linked with the efficiency of killing, and the rewards are genuine. "As a professional military man," wrote one previous Antarctic pilot, Marion E. Morris, "I was involved for all too short a while in an endeavor of peace; an endeavor which taxed my ability as strenuously as any of the times of combat."

When a Herbie blows in, it's serious stuff

Some pioneer Antarcticans complain that the day of heroic exploration is over: "The horizons have been looked over," one wrote. "Now we're looking under rocks." But the whole Antarctic support system, with the pilots at its heart, was taxed as strenuously as it ever has been in its August 1983 attempts to fly people and supplies to McMurdo. Three LC-130s had just passed the point of safe return on the way south from Christchurch when a Herbie, the nickname for a ferocious storm, blew in to McMurdo and shut down the airport. In Antarctica, however, there are no alternate airfields, so the three aircraft had to land in weather that anywhere else in the world would have been avoided as fatal.

"It didn't take long for us to realize that this was real serious stuff," one of the passengers remembered of the time the aircraft spent circling for its final approach. "I said my prayers and made my amends. It seemed the most sensible thing to do."

It was so cold on the ground that fluorescent lights

would not go on, and men worked inside wearing parkas. Visibility was 25 feet. Capt. Brian Shoemaker, commander of the Naval Support Force, was in the control tower peering in vain out into the blowing snow. One by one the three aircraft turned into the wind and slipped toward a ten-mile-wide wedge of smooth ice near McMurdo surveyed for just this eventuality. The copilot, engineer and navigator read off airspeed and course to the pilot in a litany of survival practiced over and over on better days. Like feeling for a toehold on a cliff with a string, the pilots felt for the surface with those numbers. When they touched down—all safely—and brought the planes to a stop, it was as if they had found a place to land in the sky: they still could not see the ice's white surface through the white atmosphere.

The whole continent is an airfield, if you pick your spots with care. That's another part of the adventure of supporting science. One morning I flew on a reconnaissance flight with members of a meteorite-gathering team to the inland ice plateau, where the occasionally bare rock of the continent's edge gives way to the endless plains of snow, ice and crevasses that dominate Antarctica.

It was beautiful beyond reason. I knelt beside one of the tiny portholes of the LC-130 and stared out at the miles of blue ice where the wind had blown the snow clear. The men in the plane with me would soon spend more than a month and a half traveling across this ice on snowmobiles, picking up the meteorites that lie on the surface. So many meteorites and their fragments have now been found over the past 18 years that a full third to a half of all the meteorites available for scientific study in the world have been found in Antarctica, including one identified as coming from the moon and another that may be from Mars.

The profusion of stones from space is explained by some as the product of an ice-collection system in which ice rising against upsloping ground below is ablated by wind, concentrating on the surface whatever the glacier has gathered over the centuries. But as I pressed my face against the plexiglass like a child, a more fanciful explanation came to mind: from the plane the blue was so pale and clean and swirled by snow that the ice seemed to be a warm cirrus sky into which the meteorites flew like birds into a window.

We descended to the edges of this strange blueness and, like a mosquito flirting with the water, touched

LC-130 tried to make a ski landing at South Pole in 1973 but came down on the wings. No one was hurt and it has since been raided for spare parts. There have been 51 U.S. aircraft lost in Antarctica since 1946.

Lemaire Channel, on the Antarctic Peninsula's west coast, has been jokingly called "Kodak Gap" because no one can resist shooting pictures along its seven miles. It was first sailed in 1898 by Belgian expedition.

the surface of a snow-covered area with our skis at about 110 knots, testing it. There was both hardness and give to the feel of the surface that thumped against us: it was easy to understand why, in terms of legal property, ice requires novel interpretations. In the plane, crew members and scientists who had been through this before stretched out their arms and hung on to the nylon webbing of the seats. The thumping went on for a long time. White humps raced past the window. (The pilots call this a "ski drag"; the intention is not to land but rather to test the surface as a possible landing site.) Here we were at the boundaries of the known Earth, creasing untouched snow on a mile of ice. Would we hit a hidden crevasse? Would we float away? Would we survive?

Scientists savor the adventure, too

Adventure by itself here is frowned upon by some nations, particularly the United States, which sees most private climbing or exploring expeditions as frivolous pursuits of ego through self-imposed hardship which sometimes lead to unnecessary search-and-rescue missions. But the adventure of Antarctica is part of what drives the scientists. As the LC-130 pulled up from the ice and flew back to McMurdo to get fuel and try to find a better landing spot, I thought that here indeed was a special mixture. The adventure is enriched and made real by the goal: the precious egg of the penguin.

Sometimes the combination seems to result in raw delight. One afternoon I stood beside a blue hole in the ice of McMurdo Sound while bubbles, crushed ice and laughter rose from Gregg Stanton, a biologist from Florida State University, who was at the end of an air hose, 70 feet down. The water was 29 degrees F, and while dribbles of searing cold leaked into his dry suit, Stanton was laughing into the intercom at the beauty and plucking samples from the bottom. "Who else wants to be famous?" he asked the creatures. "The herbivores are *enormous*!" He came up with a basket full of sea spiders, stars, worms and a huge isopod (a crustacean) that looked like a two-inch wood louse.

The isopod compellingly reminded the group's leader, David White, of trilobites, fossils found in ancient rocks. All the way back to McMurdo in a little crawling tractor, White kept shaking his head and grinning. "I'm going to have nightmares about that isopod," he said. "It's as if it came right out of the Cambrian sea."

Earlier I had built and lived in an igloo with Gregg Stanton as part of a two-day survival school that all are required to take in preparation for going into the field. The National Science Foundation's safety rules are so extensive that some people chafe under them, but the rules take much of the sting out of the adventure: the United States, for all its whiteout landings, probably runs the safest program on the continent. I was proud of my contribution to the igloo, but when I finally did get into the field I didn't have much use for my new skill with snow blocks—I went to one of the driest places in the world.

It was another morning, about time for Shaunessy Everett's radio roundup, out on a hillside above Lake Vida in the Antarctica's famous dry valleys (SMITHSONIAN, November 1981). I lay in my sleeping bag, in a tent pitched on sand, reevaluating my plans for getting up after having discovered that my damp insulated trousers, which I had neglected to put inside the bag with me the night before to keep them warm, could now stand on their own. I could hear Michael Malin, a geologist from Arizona State University, working his way out the tube doorway of his tent into the ten-degree sunshine. His voice was muffled. That door was always trouble. "Hatch coming open, Houston," he said, just before he started singing.

Mike Malin would have loved to think we were on Mars. In the enormous valley outside were solitary marching sand dunes, the dried carcasses of seals that had hauled themselves up here and died, utter silence and rocks shaped only by windblown sand into the images of trolls, monoliths, slugs, monkeys, shark fins, piles of corpses, whales, cattle, Volkswagens, little Buddhas. Malin, who is studying wind erosion in Antarctica, likes to come here, he says, "to calibrate my eyes" so he can understand what he sees when he works with Mars photos. This place was indeed so strange it felt extraterrestrial, but there was one fundamental difference between here and Mars: here, at least, you could hear Malin sing. The song this morning was from *Fiddler on the Roof*, adapted to Antarctica: "Sunrise, sunrise; sunrise, sunrise."

Speculating as our fingers froze

Later, having put on the frozen pants, I was out with Malin and his assistant, doctoral candidate Dean Eppler, sitting on a stone shaped like a Weddell seal, bolting rock samples to a rack for Malin's wind-erosion experiment, laughing as our fingers froze, telling stories and engaging in a common pursuit: speculation over Antarctica's future. "I'd prefer to see it kept as an international hands-off zone," Malin said. "A clean lab, if you will."

I stopped bolting samples and shoved my hands into big mittens to bring them back to life, and tried not to think of frostbite. Antarctica still is a clean lab, it seemed. Here scientists can keep track of global atmospheric changes without local smog, or listen to the deep hum of wind blowing over mountains without

the roar of cities, or look at lake chemistry without sewage, or pick meteorites off blue ice, or count particles from the sun. As Antarctica joins the world, what it is may become less clear.

Suddenly, up over the hill came a helicopter, thundering into our camp in a halo of heat. It was a DV tour. The Distinguished Visitor was Edwin Salpeter, an astrophysicist, one of the developers of quantum theory, and a member of the U.S. National Science Board. Salpeter, in his red parka with his hair swept back from his forehead as if by wind, was wild and happy and alive with energy: he was like everyone else here. He and Malin instantly plunged into conversation so urgent it seemed as if the whole future depended on what they had to say. Later, Salpeter described what enthralled him about Antarctica.

Elsewhere people have developed theories about the Earth based on data they already have, he said. In a sense they cheat, making the theory fit the data. In some disciplines you can run an experiment in which the theory (gunpowder explodes) is used to predict the outcome (boom!) and thus you test it. You can't, however, run similar tests of some of our most far-reaching ideas, like the theory of plate tectonics. But here now is Antarctica, fresh, new, unknown. Bring your old ideas here and apply them to the rigors of this new evidence, and they will come out true or not. This is the experiment, the grandest in the world.

One night Edwin Salpeter attended a toga party put on by the McMurdo helicopter pilots, and although he was adequately outfitted in a sheet he was not among those who wound up walking through the bright, breezy 15-degree evening in scanty costume chanting "Heelo! Heelo! Heelo!" But in a culture in which serving science is the highest achievement, he was a star, nevertheless. "There is no other population of spokesmen for Antarctica but the scientists," said one Antarctica observer. As far as any human beings belong here, scientists are Antarctica's natives. Will we exploit them, or respect the way they have painstakingly pieced together the Antarctica we know?

Weeks later, deep in a long fall twilight, the helicopters went out from the *Polar Sea* and brought the scientists back from Mt. Siple. The big red ship turned and steamed north. A blizzard swept down and erased the view aft of the mountain. Ice floes pressed close to the hull, clanging on the steel. A blue-walled iceberg passed slowly to port. Watching from the bridge, I came to think of the blue of the ice as if it were a belief rather than a fact, like the specialness of Antarctica itself, as if I would have to justify it or testify to it later to skeptics, because it is so impossibly, gently beautiful that it must not really exist: it's mystical, a dream. I stared at the blue, and then a snow petrel appeared, a white bird against that impossible color.

Much later John Heap of Britain would say: "You went to Antarctica. You found it a bewitching place." It happens to most. It had happened to him in 1955. John Heap would have more to say when I left this place and considered its future. But today it was snow petrels and blue ice: enough.

On the bridge Wes LeMasurier was studying a jagged old berg that rose on the horizon, its ice fangs glowing red with low sun. LeMasurier is an Antarctic scientist, a native. He had the right attitude. He said: "Looks like the Tower of Pain to me."

Four days later we were off Deception Island, which resoundingly lived up to its name in the late 1960s when its safe harbor poured ash and lava all over the three bases ensconced within. In 1821 two men who have since been separately acclaimed as discoverers of Antarctica by their respective nations met by amazing chance in these waters. Sailing through fog, each thought himself alone at the farthest reaches of the Earth, but when the fog lifted they were together: the American, Nathaniel Palmer, captain of the sloop *Hero*, and the Russian, Thaddeus Bellingshausen, commander of the ships *Vostok* and *Mirnyy*. Their conversation was probably as inconsequential as it was amicable, but their meeting itself was not. One hundred and sixty-three years later, when I was left at the Soviet base named Bellingshausen by the U.S. Research Vessel *Hero*, that meeting still helped define the special relationships between nations and human beings in the Antarctic which, as unusual as the region's lands, waters and foundation of science, are also part of its promise.

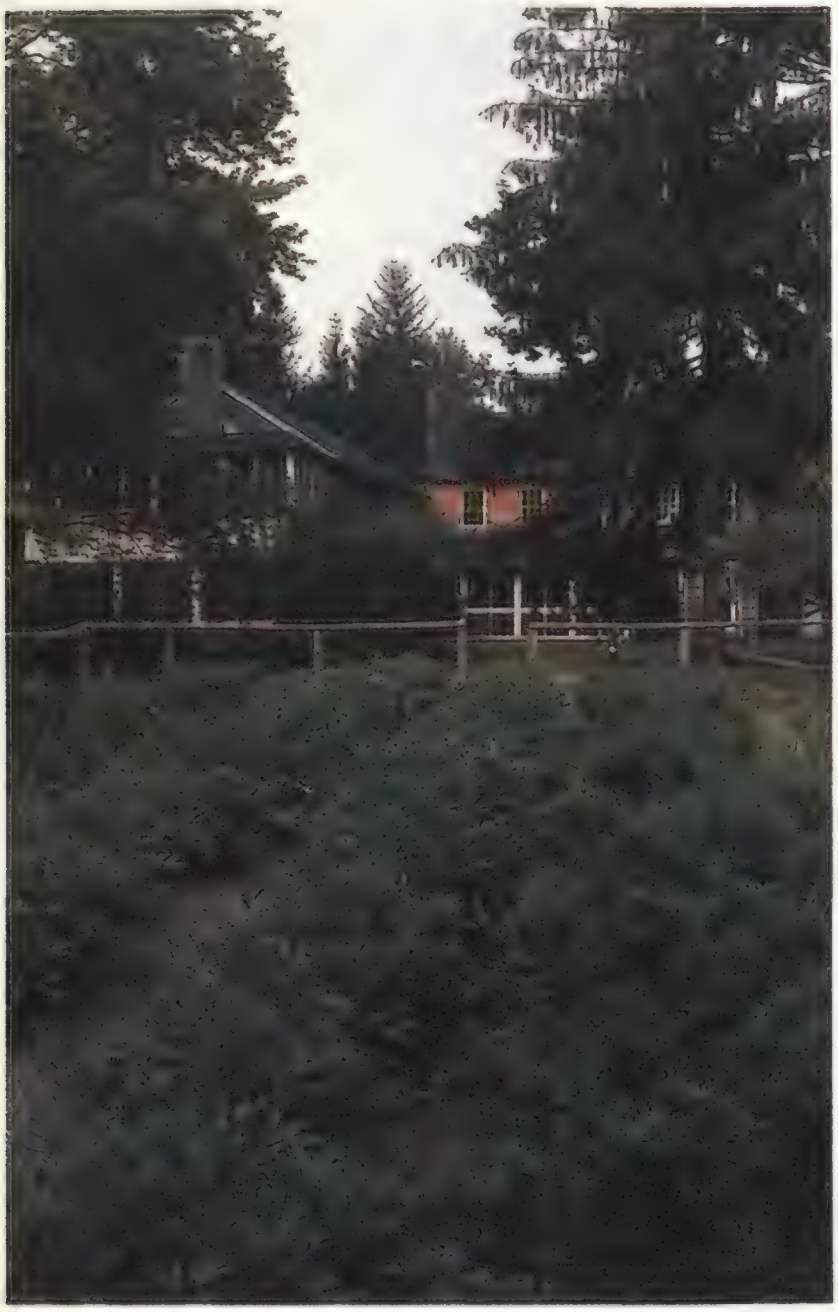
Rare sight in Antarctica: a private sailboat lies at anchor in the calm harbor of Deception Island.

Next month: Politics on the ice

By Geoffrey C. Ward

Eleanor Roosevelt drew her strength from a sanctuary called Val-Kill

Her marriage to FDR was never easy, but she achieved independence at a retreat that has now been designated a National Historic Site



The cottage, a converted furniture factory, became a gathering place for Mrs. Roosevelt's friends, family.

There is nothing especially imposing about Val-Kill, Eleanor Roosevelt's home at Hyde Park, New York, which officially opens to the public this month on the 100th anniversary of her birth. Visitors approach it along a bumpy lane that threads its way between woods and ragged fields, circles around a pond, crosses a noisy plank bridge and ends in a grove of spindly pines. There are two main buildings on the property: a small handsome fieldstone cottage, flanked by beds of flowers, which Franklin Roosevelt had built for his wife and two of her friends in 1925; and behind it, half-hidden at first among more substantial trees, an ungainly two-story gray stucco structure that still resembles the furniture factory it once was. That is where Mrs. Roosevelt lived for much of the last quarter-century of her life; characteristically, when her partnership with her friends dissolved, it was she, not they, who moved into the converted factory.

Still, it is an evocative place, the only National Historic Site dedicated to the memory of a First Lady, and a monument both to a remarkable but troubled marriage and to its owner's determination to have a life and a home of her own. (For the centennial, Smithsonian's Museum of American History is presenting an exhibit, "Eleanor Roosevelt: First Person Singular," through January 6.)

The story of Eleanor Roosevelt's struggle for independence is far better known now than it was during her lifetime, thanks largely to the work of her friend and biographer Joseph P. Lash, and to the television programs based upon his books. We now know that she was far more than her crippled husband's "eyes and ears" during their dozen years together in the White House; she often acted as FDR's conscience as well, and sometimes as his goad, reminding him of the needs of people otherwise without access to him, while pursuing a host of political and social interests of her own. She set the standard against which every President's wife since has been measured, and after her husband died she became if anything more

In her garden, Eleanor Roosevelt cut the flowers that she later arranged and placed in guests' rooms.

Visitors leaving Val-Kill would frequently find flowers wrapped in damp paper in the back of their cars.

active, tirelessly campaigning for human rights and international cooperation—and for political candidates whom she believed would best carry forward the traditions of the New Deal. The title "First Lady of the World," which was perhaps inevitably conferred upon her during the final busy years of her life, may have been a little cloying but it was also accurate; no woman was more universally admired.

Yet no matter where she went or what she was doing, she yearned to come back to this modest house and the woods and fields that surround it. "My heart is in the cottage," she once told a friend, and a glance back at her parched beginnings suggests why. Her father was Theodore Roosevelt's alcoholic and unstable younger brother, Elliott, whose noisy disintegration preoccupied and exhausted her beautiful but distant mother. Even before she was orphaned at nine she had been rootless, parceled out to relatives in a succession of exiles and abandonments which helped persuade her that she was somehow odd, unattractive, unable to count on anyone's love for long. At two and a half she asked her aunt, "Where is baby's home now?" and received no satisfying answer; there was none to give. At 18, she told another aunt "I have no real home," and burst into tears.

Her marriage in 1905 to her buoyant fifth cousin Franklin seemed at first to promise just the sort of stability and support for which she longed but, although the Roosevelts had six children over the next 11 years (five of whom lived), she never found in her husband a wholehearted emotional partner. He was unable even to provide her with a home of her own. Their first house, in New York City, had been rented, staffed and furnished for them by his fond but iron-willed mother, Sara Delano Roosevelt. In 1907, Sara had their second home built as a Christmas gift, then moved into its twin next door, connected with theirs

Domineering Sara Delano Roosevelt (center) strongly influenced the marriage of her son, FDR, and his wife.

The pool was often the hub of activity and Eleanor Roosevelt (center) would join friends for daily swim.

Nancy Cook (left), Esther Lape and Marion Dickerman join Mrs. Roosevelt and a young friend for picnic.

For nearly ten years Eleanor Roosevelt and friends Dickerman and Cook ran a furniture factory.

by doors that were never locked. Summers were spent on Campobello Island, New Brunswick, in a cottage which stood just down the beach from hers. Even Springwood, the big comfortable old house at Hyde Park, in which FDR had been born and raised, and with which the public always associated him, was actually his for only the four brief years between his mother's death in 1941 and his own. It was still less his wife's: when the Roosevelts adjourned to its book-lined living room after dinner, FDR sat in one of the two massive carved chairs that flanked the fireplace, his mother in the other. "I sat anywhere," Mrs. Roosevelt recalled.

By the 1920s, the Roosevelts' relationship was more merger than marriage, an affectionate and hugely effective partnership based on a shared past and mutual interests, but without passion or intimacy. Mrs. Roosevelt's discovery of her husband's romance with her social secretary during World War I, and her refusal ever to forgive him for it, had seen to that. And she had begun to carve out a career for herself in political and social work, allied to his but independent of it as well.

Among the women she came to know and like were two who had lived and worked together for some years, Nancy Cook and Marion Dickerman. Miss Dickerman was tall and somewhat mournful-looking, an educator and social worker who had run for the New York legislature in 1919. Nancy Cook had been her campaign manager: she was short, sturdy, vigorous and able to "do almost anything" with her hands, Mrs. Roosevelt wrote—jewelry, gardening, cabinetmaking.

Sometime in the summer of 1924, Franklin and Eleanor Roosevelt, Cook and Dickerman spread a picnic on the grassy bank of the Val-Kill, a cold clear stream about two miles east of Springwood, on land FDR had bought for himself. It was a lovely place and a beautiful day, and Mrs. Roosevelt lamented that this would be one of the last picnics of the year; her mother-in-law was soon to close the big house for the winter. FDR then suggested that the three women build a cottage on the spot; Cook and Dickerman could live there year-round if they liked, and his wife could join them whenever she wanted. He would give them a life interest in the land and supervise construction.

It was a generous gesture, but it also gave him an interesting project to oversee at a time when he had little else to occupy him other than his struggle to come back from infantile paralysis. "My Missus and some of her female political friends want to build a shack on a stream in the back woods," he wrote a contractor friend in the affectionately patronizing tone

The author, former editor of American Heritage *magazine, is at work on a book about the early years of Franklin Roosevelt to be published in 1985.*

Christmas was the highlight of the Val-Kill year for Mrs. Roosevelt and meant lavish food and gifts for all.

She delighted in shopping throughout the year to find just the right presents to give each of her guests.

which he sometimes used to discuss his wife's activities. The stream could be dammed to form a pond, and its water diverted to fill a pool in which he might exercise away from the claustrophobic solicitude of his mother. He signed on an architect, Henry Toombs, and told his wife, "If you three girls will just go away and leave us alone, Henry and I will build the cottage." They did, and on New Year's Day 1926 it was officially inaugurated with a dinner party to which the whole Roosevelt family was invited; everyone, including Sara Delano Roosevelt, sat on kegs of nails.

"The peace of it is divine," Mrs. Roosevelt told her husband the first summer she spent there. She and her two friends all slept for a time in the same big dormitorylike bedroom upstairs, in a proximity that some visitors found startling; even their towels were embroidered with their intertwined initials. Life in the stone cottage in those early years had something of the air of Allenswood, the boarding school in England where Eleanor Roosevelt had spent three adolescent years, "the happiest years of my life."

Yet this was only the first of a series of extraordinarily fervent friendships Mrs. Roosevelt would form over the decades. The recipients of her devotion would eventually include not only Cook and Dickerman, but the newspaperwoman Lorena Hickock, a genial strapping state trooper named Earl Miller—who was her bodyguard when FDR was Governor of New York—Joseph Lash and his wife, Trude, and in her later years her physician David Gurewitsch and his wife, Edna. All would frequently visit Val-Kill and some would live there off and on. These men and women had little in common other than that there were ways in which Mrs. Roosevelt had felt she could help them. Unable to attain the emotional support that she needed from her husband, she found satisfaction in gathering

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Close friends, Adlai Stevenson and Mrs. Roosevelt shared interests in politics and the United Nations.

First meeting with Eleanor Roosevelt left Presidential nominee John F. Kennedy "absolutely smitten."

After delivering Memorial Day speech honoring FDR, Senator Lyndon B. Johnson met with Mrs. Roosevelt.

around her those whom she believed needed her.

In 1926, the three women built a furniture factory behind their cottage, intending to operate a successful business while helping local farmers and their sons stay on the land and earn a living during the lean winter months. Nancy Cook ran it, basing the designs for her bedsteads and trestle tables and bookcases on Colonial models. Mrs. Roosevelt provided most of the financing and saw to the marketing, making the rounds of New York department stores herself, sample book in hand.

She still stayed overnight at Springwood whenever her husband or her children were there. But sometimes the strain became too great, and one summer evening, Marion Dickerman remembered, a distraught Mrs. Roosevelt appeared at the cottage. For three days she refused to take calls from Springwood. Finally, Cook called FDR and told him to come over and talk to his wife. "But will she talk to me?" he asked. Cook thought she would, and so he drove over in his hand-controlled Ford. Mrs. Roosevelt reluctantly joined him in the front seat of his open car and they sat talking in low tones for nearly two hours before FDR started up the engine and took his wife home with him to his mother's house.

Finally, a home of her own

The furniture business foundered, and in the spring of 1936 the factory was closed. Mrs. Roosevelt's friendship with her partners had begun to falter, too, for reasons never made entirely clear by anyone involved, and the following year she moved into the remodeled factory building. This was truly her own home and she eagerly saw to every detail of its furnishing. Her life at Val-Kill seemed almost consciously to mock the formality of her mother-in-law's establishment. The walls were knotty pine, the rugs laid down straight from the department store. "There wasn't a lampshade that wasn't askew," a frequent guest remembers, "and nobody cared if the cups and plates matched." There were framed pictures everywhere—103 in her sitting room alone—mostly photographs of friends and family.

"Tommy"—Malvina Thompson—her dedicated secretary who devoted her life to working for Mrs. Roosevelt, lived in an apartment of her own in one wing of the first floor. Mrs. Roosevelt lived in another wing with a bedroom upstairs, but she spent all but the coldest nights on a big adjoining sleeping porch where she could enjoy what she once called the "peace of nature . . . healing and life-giving." She especially liked being snowed in on winter days, undisturbed except by the "occasional creaking of a branch or the distant crackling of the ice in the brook"; and every summer morning she watched from her bed as the sunrise was re-

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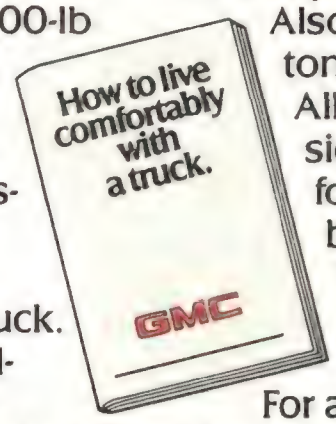

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GMC S-15 four-wheel-drive Jimmy.

flected in the still surface of her pond, its shore blanketed with purple loosestrife and punctuated by birch trees, their mirrored white trunks seeming to "reach down toward the bottom."

Time for contemplation was rare, however, for Val-Kill soon became the social center for the Roosevelts whenever informality seemed in order. A large stone fireplace on the lawn permitted big cheerful picnics at which Mrs. Roosevelt happily presided, spooning out potato salad and grilling hot dogs for her husband's friends and for her own. (A smaller grill was placed next to FDR's lawn chair so that he could prepare his own steaks as blood-rare as he liked.)

Nancy Cook was an enthusiastic maker of home movies, and her thousands of feet of jittery film provide an intimate record of life at Val-Kill during the gubernatorial and Presidential years. One by one, the supporting players in the Roosevelts' vivid drama flicker past her camera. Tiny, wizened Louis Howe, already dying of a host of ailments, feebly tries to blow out the candles on his birthday cake. Harry Hopkins, almost equally frail, capers barefoot within the President's outsize bathrobe. While someone else holds the camera, Nancy Cook and Marion Dickerman skip rope girlishly in shirtwaists and long dark skirts. Sara Delano Roosevelt sips tea beneath a parasol, queenly and apparently serene even on her daughter-in-law's hard-won territory. Big Earl Miller, his handsome face split by a grin, his hair parted precisely in the center, strolls arm-in-arm with Mrs. Roosevelt, and later rides laughing alongside her through the snow, three police dogs barking silently at their horses' heels.

There are fleeting glimpses of FDR, too: performing childish hand tricks; playing water polo, his thin hair plastered flat, hurling the ball like a bullet; and seated next to the pool in a dark bathing suit, teeth clenched around his cigarette holder, his enormous torso swollen to the point of caricature above his white, withered legs.

He died in April 1945 at Warm Springs, Georgia. On the slow sad train trip north, Mrs. Roosevelt resolved to live out her widowhood at Val-Kill: ". . . it was mine," she wrote, "and I felt freer there than in the big house."

She planned a quiet life, working on behalf of her many causes but blessedly out of the Washington spotlight. "When I warn my friends that I am going to sit by the fire with a little lace cap on my head and a shawl about my shoulders and knit baby things for the newest generation," she wrote, "they look at me with some incredulity. The day will come, however, and when it does I think it will be rather pleasant." It never came of course. She could never stand to be idle, "could not bear to be alone," her last secretary, Maureen Corr, remembers.

"When you cease to make a contribution," she said at 74, "you begin to die." She maintained a New York apartment so as to be near the United Nations and her other interests, and she actually accelerated the peripatetic travels she had begun as First Lady. Val-Kill was meant to be her retreat, a place to relax, but her notion of relaxation was different from anyone else's. She spent as much time there as she could, but surrounded whenever possible by friends and family. And after 1947, when Cook and Dickerman finally vacated the stone cottage and Mrs. Roosevelt's son John and

Guests arriving at Val-Kill were often announced by the clatter of their cars crossing this plank bridge.

his family moved in, there was always a full complement of grandchildren all summer as well, riding horses and boating on the pond. "Where Mrs. Roosevelt was, life flourished," Edna Gurewitsch remembers. "Dogs barked. The cook's grandchildren were being scolded. There was the smell of baking. Someone was diving into the pool. Something was *happening*."

Her guests were encouraged to rest while they were with her. She herself never wasted a moment. "I never saw her when she wasn't doing something," a friend remembers. She rose early to cut flowers so that when her guests arrived they would find in their rooms vases filled with varieties she knew they especially liked. Nearby were books she thought they might enjoy, along with bowls of favorite fruit or candy. She planned the day's menu with Marge Entrup, her able and patient cook during her final years, who grew accustomed to having her employer tell her that she was at last growing old and would have to cut back on her entertaining; meanwhile, "Only 14 for breakfast tomorrow, Marge."

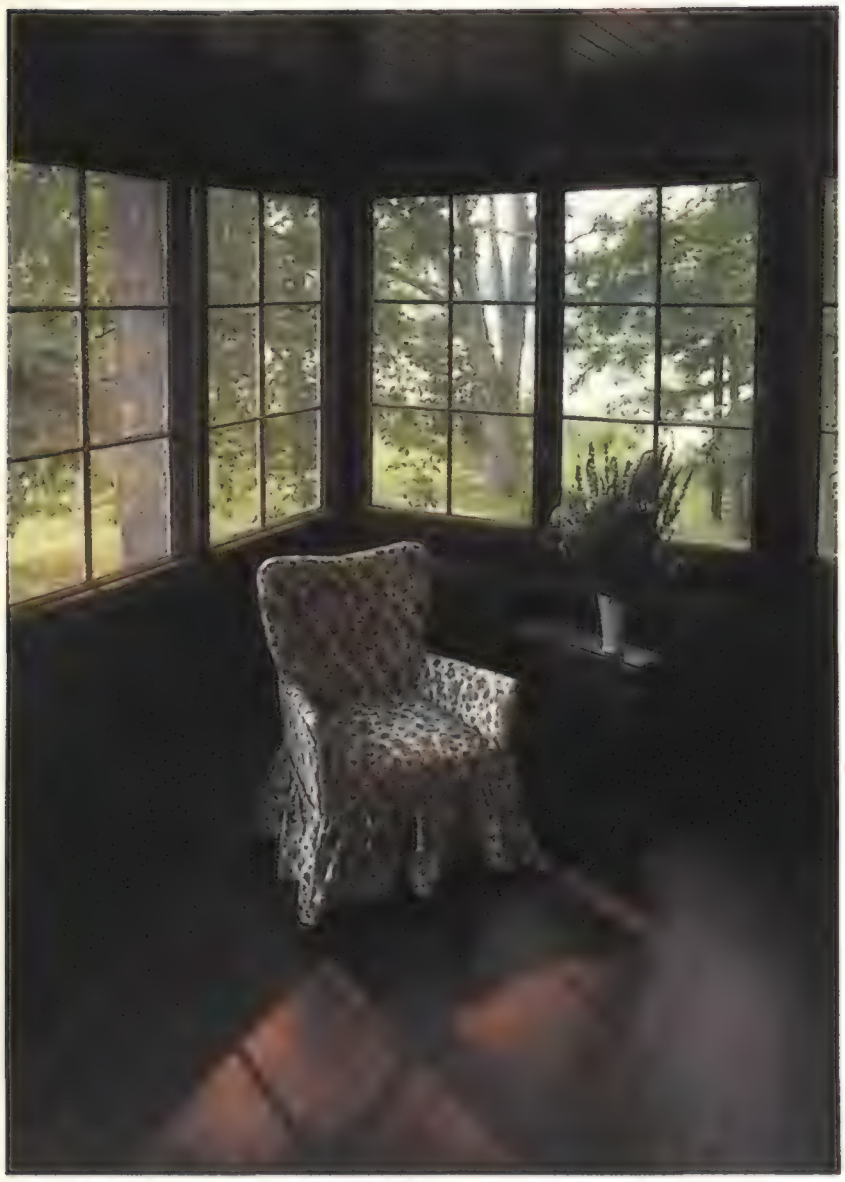
She wrote all her own checks and balanced her checkbook, and she liked to shop, too, standing in the checkout line at the Grand Union or driving across the Hudson to a favorite farm stand in search of bargains. At least once a day she took a long walk in the woods with her dog, first her late husband's Fala and then with one or another of his boisterous Scottie successors, and in warm weather she plunged briefly into the pool, an activity she hated but thought "good for my character." And she found time to dictate her "My Day" column, write articles and books, brief herself for public appearances and keep up with the mail that was delivered by the sackful.

Disparate mementos of a full life include radio from newsman Fulton Lewis jr., picture of favorite teacher.

On summer mornings Mrs. Roosevelt used to watch as the sunrise was reflected in the pond's still surface.

Luncheon guests might include one or two of her sons, Princess Beatrix of Holland and a lady-in-waiting, Adlai Stevenson, two Mormon missionaries who had happened to knock on the door, an out-of-work actor, an astonished couple she had chanced to meet on a train. And there were far larger events, including the ceremonies honoring FDR on Memorial Day each year, to which scores and sometimes hundreds of old colleagues and new admirers came; and the picnic for the delinquent boys who attended the Wiltwyck School at Esopus across the river, some 150 of whom descended on the grounds annually to eat hot dogs, roam the woods and listen more or less attentively as Mrs. Roosevelt seated herself on a log and read to them from Kipling's *Just-So Stories.*

Foreign statesmen came too, bringing with them their ravenous entourages: India's Prime Minister Jawaharlal Nehru and his daughter, Indira Gandhi; Marshall Tito of Yugoslavia; Ethiopia's Emperor Haile Selassie, for whom lunch was delayed half an hour so that he might watch himself on television for the first time in a pre-taped interview. No airs were put on for these visits. No extra help was hired. Marge



Mrs. Roosevelt spent most nights on this sleeping porch where she could enjoy the "peace of nature."

Entrup had to manage with just the six burners in her small kitchen. Her husband, Les, supervised the serving. Overnight guests pitched in, tossing the salad or setting the table. Mrs. Roosevelt herself dished up the food, chewing on her tongue in concentration, making sure that everyone had just what they wanted. And after the dignitaries left, Marge would ask "Well, Mrs. Roosevelt, how'd I do?" and receive a grateful kiss.

Nikita Khruschev's visit in 1959 almost permanently altered the look of Val-Kill. The Secret Service announced before he came that its agents could not adequately protect him there unless a number of trees were cut down. Nonsense, Mrs. Roosevelt replied; the Secret Service had always protected Franklin perfectly well during *his* visits to the cottage. The trees stayed. As many of her opponents learned to their sorrow, Mrs. Roosevelt could be very tough and shrewd, and that side of her, too, sometimes showed at Val-Kill. When old friends gave her two piglets as a Christmas gift and the animals proved impossible to keep penned, she told her farmer to slaughter them right away; a pair of less ambitious pigs was fattened up and later enthusiastically shown off to the donors as the originals. One year a visiting Wiltwyck boy stole her keys. She asked the whole school back later that day, ostensibly to help her search for them. When one boy "found" the keys, she thanked him for being so very helpful. After that, every time the school came she quietly suggested to her guests that they lock their cars and pocket their valuables so as not to place temptation in the boys' way. (She needn't have worried; the word had gone out among them by then that "you don't lift from Mrs. Roosevelt.")

Even on comparatively uneventful days there was often a handful of new guests at dinner. Mrs. Roosevelt took a brief nap beforehand, sleeping on her good ear to block out the shouts of her grandchildren. Drinks were served exactly 15 minutes before dinner—a single drink actually, usually blonde Dubonnet on ice for Mrs. Roosevelt. "The food was delicious those last years," Edna Gurewitsch insists, no matter how famously mediocre it had been in the White House, and the talk was relaxed but wide-ranging. Even then, a certain brisk but gracious efficiency was often in evidence. Mrs. Roosevelt sometimes filled and passed the dessert bowls so rapidly that her hands seemed actually to blur, and there was rarely much after-dinner conversation.

At a few minutes before ten she would turn, smiling, to one dinner guest and suggest that since he or she happened to be going in the same direction as another, perhaps they might travel together. And when they left, they often found that flowers wrapped in damp paper to keep them fresh had been placed in their cars, alongside jars of cooked rhubarb from the kitchen garden. She then spent a few minutes more with her overnight guests before saying, "Well, children . . ." and, rising from her chair, bid each visitor goodnight: "Blessings on you," "Thank you for a lovely day," "Sleep well."

She was left alone at last. While her guests settled in for the night, she stayed up until two or three in the morning answering letters from friends and total strangers, the only sounds the frogs in the pond and the scratching of her fountain pen.

Christmas was the highlight of the Val-Kill year. Mrs. Roosevelt kept meticulous lists of all the gifts she had sent to scores of persons over the years so that she might never repeat herself, and she began her Christmas shopping "about January second," or so it seemed to Edna Gurewitsch. Items she had ordered by mail arrived almost daily during the spring and sum-

Tamas, a descendant of FDR's famous mascot, Fala, accompanied Eleanor Roosevelt on her daily walks.

mer, and she brought others home from everywhere she traveled. The staff had orders to wrap them whenever they had a few moments to spare. Everything was in readiness by early autumn, an upstairs closet no longer able to contain all the red and green packages.

In the early hours of Christmas morning, Mrs. Roosevelt herself padded silently along the corridors of her cottage, leaving stockings stuffed with sweets and small but shrewdly chosen presents outside each guest's room. There were more gifts at each visitor's place at the dinner table. Mrs. Roosevelt offered her traditional toast—the same one she gave on the Fourth of July and Thanksgiving—"To the United States of America. To the President. To those we love who are not with us today." Franklin Roosevelt jr. carved the turkey with as much of his father's old flourish as he could muster. John Roosevelt carved the ham.

After dinner everyone filed into the living room, where there was a tree, and the guests found their assigned chairs, each one heaped with still more gifts. Mrs. Roosevelt moved around the room as they were unwrapped, making sure that sweaters fit, toys pleased, books had not already been read. Her own gifts were left for last; one guest recalled that she liked best those things such as cheese and champagne which she could immediately share with others. She was firm about only one thing: paper and ribbon were to be saved and handed back to her to be used the following year.

Eleanor Roosevelt died in her New York apartment on November 7, 1962, at the age of 78. She had not wished to die at Val-Kill, she had told friends, because to do so would have inconvenienced so many people who might wish to come and see her. She was buried at the big house, in her mother-in-law's rose garden beside her husband, as he had wished. A few weeks later, however, packages from Mrs. Roosevelt arrived in the mail for many of the friends and family members who had traditionally spent Christmas with her at Val-Kill. The gifts had of course been wrapped and ready since the summer.

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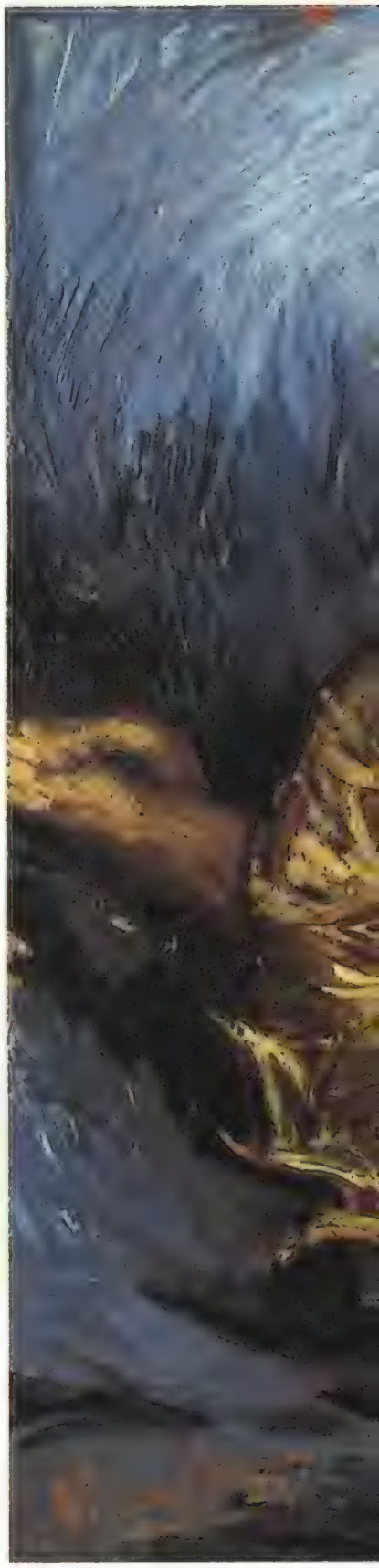
Fogg Art Museum, Harvard University, Bequest Collection of Maurice Wertheim



As naked a portrait as exists, and as beautiful, this is how van Gogh saw himself at summer's end, 1888.

By Bennett Schiff

Triumph and tragedy in the land of 'blue tones and gay colors'

Metropolitan Museum of Art, Rogers Fund

Van Gogh: "the peony is Jeannin's, the hollyhock belongs to Quost, but the sunflower is mine. . . ."

Vincent van Gogh came to Arles for respite and painted one masterpiece after another in a tumultuous year—then came the crack-up

Vincent van Gogh, age 34 hard years, failure and misfit, arrived in Arles in the sunny South of France on the afternoon of Monday, February 20, 1888. It was snowing. That was how things had gone for him. When, less than three years later, he shot himself, he botched the job. It took him more than a day to die. He greeted his brother Theo, who had raced from Paris to his bedside for still another crisis (not knowing it was to be the last) with the words: "Missed

Rijksmuseum Vincent van Gogh, Amsterdam

A watercolor of the Yellow House, which was painted the color of "fresh butter" and whitewashed inside.

again." A stand-up comic's line but, in his case, more like Greek tragedy.

Vincent had already begun to think himself "almost an invalid and almost a drunkard," a used-up old man, "old and broken" while still in Paris just before his trip to Provence. He was only 34 when he wrote to his sister, Wilhelmina: "My own adventures are restricted chiefly to making swift progress toward growing into a little old man, you know, with wrinkles, and a tough beard and a number of false teeth, and so on. But what does it matter? I have a dirty and hard profession—painting—and if I were not what I am, I should not paint; but being what I am, I often work with pleasure, and in the hazy distance I see the possibility of making pictures in which there will be some youth and freshness, even though my own youth is one of the things I have lost."

He had thought of the south as his Japan—"the land of the blue tones and gay colors"—as in the Japanese prints he loved and collected. And, for a while, it was that way. It was as much as he could ask for. His life had gone from one failure to another, a struggle against whatever he happened to be doing even though he pursued two of his obsessions with passion: religion and painting, which became a kind of religion.

He had worked, successively, for picture dealers in The Hague, London and Paris; been a schoolteacher in England; sold books in a Dordrecht bookshop; prepared for theological studies in Amsterdam; was a missionary among the miners of the Borinage, the "black country" of southern Belgium; and finally, declared himself to be a painter.

Now, after two years in Paris, living with Theo who completely supported him—as he did until he died—he was off to make a new start in another new place, again.

Vincent lived and painted in Arles for almost 15 months. During that time he worked frenziedly and consummately, shared quarters in his much-loved Yellow House with Gauguin for two months, broke down in anguish, and created in his 444 days there 200 paintings, many of them imperishable masterpieces, and more than 100 superb drawings and watercolors.

In New York, the Metropolitan Museum, for the first time, has gathered a substantial part of his achievement in Arles—75 paintings and 68 works on paper, pen-and-ink drawings and watercolors, and is showing them from October 18 to December 30. The show is sponsored, in part, by grants from Manufacturers Hanover Corporation and the Robert Wood Johnson, Jr. Charitable Trust. The introduction to the excellent, scholarly and illuminating catalog points out that the Arles period has been called "the zenith, the climax, the greatest flowering of van Gogh's decade of artistic activity. Yet there has been no monograph, few articles—and no exhibition."

This fresh look at his work reminds you that he had not begun his life as an artist until he was 27, that his entire career lasted only ten chaotic years. Given his genius, given the way the masters have of breaking into new modes of incandescent summation in old age —Titian, Rembrandt, Matisse, Picasso—you wonder, what might he have done if he had lived into his 60s, 70s? As it is he left the world some 800 paintings made in those brief ten years which grow and glow wherever they are seen. They have become icons, paintings that remain with you, part of your consciousness: sunflowers, starry nights, writhing cypresses, a bridge over a canal, beached fishermen's boats, a café at night, a chair, a tiny bedroom, a yellow house, flowering orchards, vegetable gardens, his unforgettable face. Only one painting is thought to have been sold while he was still alive, a red vineyard, to an artist, but even that is now under question.

He had come to Paris in 1886 for still another doomed fresh start. An ungainly, awkward, powerfully built man given to sudden starts and jerky movements, with reddish hair and piercing green-blue eyes, he was unyielding in his opinions, unable to temporize his reactions. You could get along with him for a short time but the pressure inevitably became too intense. His hunger for friendship was so naked, his demands so great, his opinions so combative and dogmatic, that people retreated from him.

And, in desperation, after his arrival, Theo wrote to their sister Wilhelmina: "My home life is almost un-

Bennett Schiff is a member of SMITHSONIAN*'s Board of Editors. He recently wrote about the sculpture garden of Nek Chand, June 1984.*

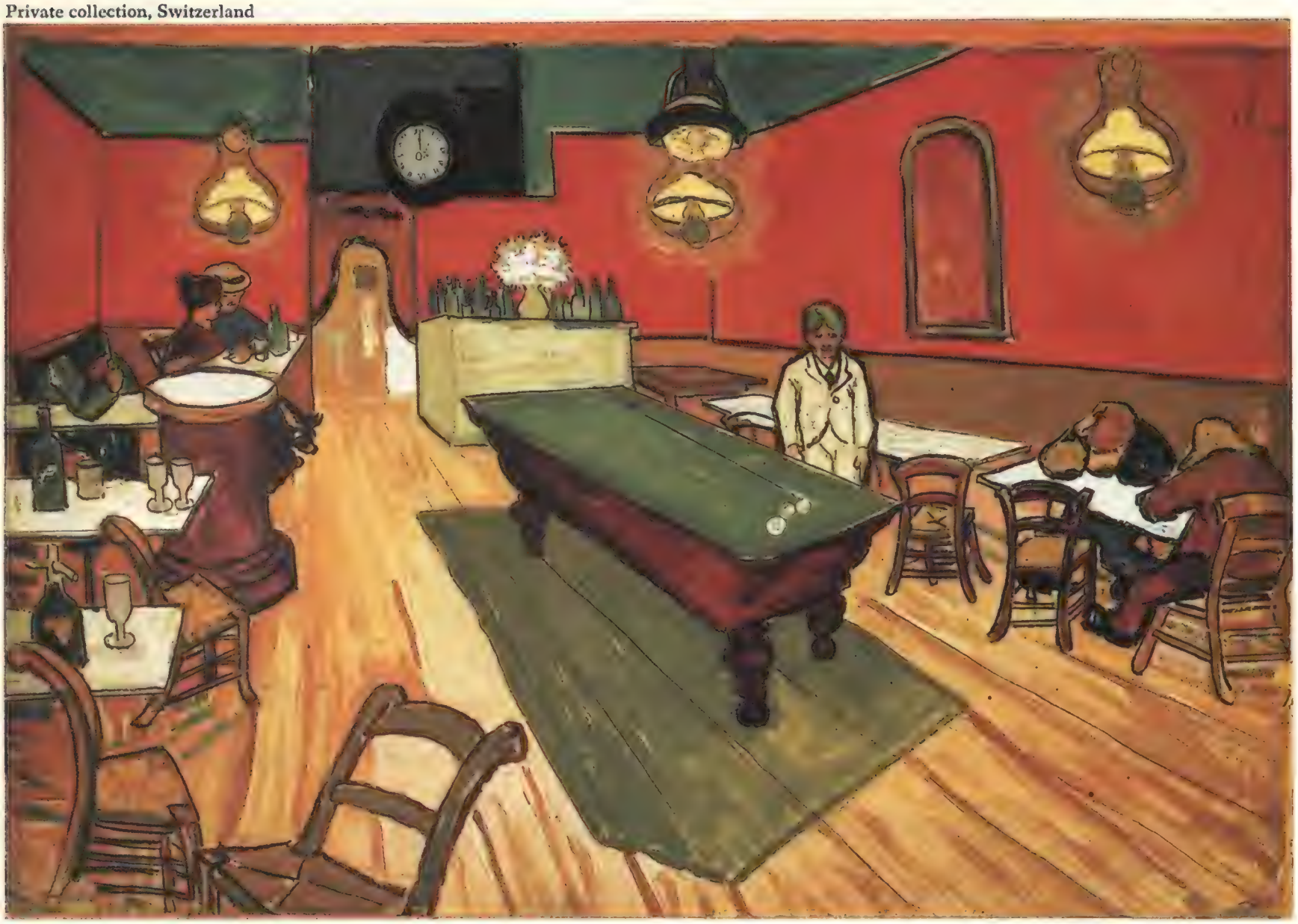
Private collection, Lausanne

Tableware for the Yellow House also saw duty as subject of a painting.

This spartan bedroom in the Yellow House is today known worldwide.

Rijksmuseum Vincent van Gogh, Amsterdam

Private collection, Switzerland



Van Gogh lived at Café de la Gare when he painted *Night Café* (sketch above), staying up for three nights, sleeping by day, trying to express "the terrible passions of humanity by means of red and green."

bearable. No one wants to come and see me any more because it always ends in quarrels. . . . I can hardly bear it. . . . It seems as if he were two persons: one, marvelously gifted, tender and refined, the other, egoistic and hardhearted. . . . It is a pity that he is his own enemy, for he makes life hard not only for others but also for himself."

The painter Paul Signac remembered painting in the suburbs of Paris with van Gogh. "Sticking close to me," he wrote, "he shouted and gesticulated, brandishing his large, freshly covered canvas, and with it he polychromed himself as well as passers-by."

Van Gogh himself was not unaware of his effect on others. According to art historian John Rewald, he wrote to a friend: "I cannot always keep quiet as my convictions are so much part of myself that it is sometimes as if they took me by my throat." But when he was quiet he was so broodingly silent that he made people uneasy.

The great city became a busy, chaotic place for him. He drank hard, became depressed. Nothing worked. He began to look to the south for quiet. His dream of establishing a studio where artists could work together in harmony, while earning a modest living, began to take shape.

But, as always, he painted and before he left Paris he had completed about 200 canvases, including at least 24 extraordinary self-portraits, a serial record of the artist looking into himself unequaled since Rembrandt, whom he venerated, and not matched since in the quality of the work and the depth and naked honesty of the observation.

He never became a formal Impressionist but the theories of the school, explained to him by Pissarro, and the discoveries of Seurat and his way of using colors in juxtaposition, arrayed in thousands of tiny dots of pigment, each intensifying the other, introduced a new world of color to him. In turn, he would open up that world in ways it had never been seen before on canvas, color as expression of emotion, but color always in the service of the purest dedication to conveying the essence—the soul—of the subject, what-

Musée d'Orsay (Galerie du Jeu de Paume), Paris

One of the few paintings that van Gogh did from memory without the actual object or scene before him, *The Dance Hall* was painted in line with the ideas of Gauguin, which for a certain time influenced him.

ever the subject was. He would write that "at moments, when I am in a good mood, I think that what is alive in art, and eternally alive, is in the first place the painter and in the second place the picture."

In Arles, Theo would continue to support him and in exchange he would send Theo paintings which would one day return the investment. He went right to work.

He almost never did not work, no matter what the circumstances, the despair, the loneliness, the penury of his existence. And he wrote letters, mainly to Theo, but also to Wilhelmina, to his mother, some to artist friends. Even if it were not for the paintings van Gogh would have to be remembered for the letters. They constitute a major work of world autobiographical literature. There are something like 1,200 pages of them to Theo alone in *The Complete Letters of Vincent van Gogh*, forming an anatomy of a man's life which, through the description of everyday events, becomes both heartbreaking and profound, a testament to a singular genius who barely had a single day of plain joy in his tortured life, except when he was painting. He wrote from Arles that ". . . loneliness, worries, difficulties, the unsatisfied need for kindness and sympathy—that is what is hard to bear, the mental suffering of sadness or disappointment undermines us more than dissipation—us, I say, who find ourselves the happy possessors of disordered hearts."

Arles was fine, except that it was more expensive to live there than he had expected. He needed five francs a day for room and board. Three should have been enough, he thought. The franc then was about five to the dollar. He stayed at first at the Hôtel-Restaurant Carrel but left after 11 weeks because he thought the rates too high. He moved into the Café de la Gare nearby in early May and stayed until mid-September, when he finally moved into the Yellow House at number 2 Place Lamartine a few yards away, a little house he had painted the color of "fresh butter." He worried about the cost of paints and canvas. "I am using a tremendous lot of colors and canvases, but all the same I hope it isn't a waste of money," he wrote Theo.

Private collection

Van Gogh found peasants to be "innocent and gentle," and persuaded one, Patience Escalier, to sit for him.

(Last May a van Gogh canvas fetched $1.76 million at a Sotheby's auction in New York, a fair price but well below the record auction price of $5.7 million paid for a single canvas, *The Poet's Garden*.) He hoped that one day Theo would be repaid in sales for all the years of support. He began to suggest to Theo and to Gauguin, ill and without money, who was painting in Brittany, that Gauguin come to join him. The plan was that Theo would subsidize Gauguin in return for pictures. The two of them would begin the brotherhood of painters.

Meanwhile, as always, he worked. In intense, thickly applied clear colors, in strongly outlined planes, employing a variety of brushstrokes and textures, he began to paint the masterpieces we know by heart today. He wrote: "I am always in hope of making a discovery there, to express the love of two lovers by a wedding of two complementary colors, their mingling and their opposition, the mysterious vibrations of kindred tones. To express the thought of a brow by the radiance of a light tone against a somber background. To express hope by some star, the eagerness of a soul by a sunset radiance." His palette became "sky blue, orange, pink, vermilion, bright yellow, bright green, bright wine-red, violet." Working on a portrait, he wrote Theo: "To finish it, I am now going to be the arbitrary colorist. I exaggerate the fairness of the hair, I even get to orange tones, chromes and pale citron-yellow. Behind the head, instead of painting the ordinary wall of the mean room, I paint infinity. . . ."

"Thus," says Rewald, whose book *Post-Impressionism: From van Gogh to Gauguin* is indispensable in understanding the artists and the period, "every one of his canvases has a spiritual content, crystallizing a genuine feeling. Though his paintings are . . . self-sufficient and do not have to be explained, they convey the obscure impression that they say much more, and much graver things, than appear on their surfaces."

Gauguin had agreed to come to Arles and van Gogh painted himself into exhaustion in preparation for the arrival of the man he admired so intensely, an unfortunate hero for him, a man with an equally pronounced view of painting and one a great deal stronger emotionally.

He was working then for as much as 11 hours, virtually without a stop. "Today again," he wrote Theo, "from seven o'clock in the morning till six in the evening I worked without stirring except to take some food a step or two away. That is why the work is getting on fast." He painted his great *Night Café*, writing to Theo: "I have tried to express the terrible passions of humanity by means of red and green. The room is blood red and dark yellow, with a green billard table in the middle; there are four citron-yellow lamps with a glow of orange and green. . . . The blood red and the yellow-green of the billiard table, for instance, contrast with the soft, tender Louis XV green of the counter, on which there is a pink nosegay. The white coat of the landlord, awake in a corner of that furnace, turns citron-yellow, or a pale luminous green." In a following letter, he says, "In my picture of the 'Night Café' I have tried to express the idea that the café is a place where one can ruin oneself, go mad or commit a crime.

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Museum of Fine Arts, Boston

La Berceuse: "As an arrangement of impressionist colors, I have never invented anything better. . . ."

So I have tried to express, as it were, the powers of darkness in a low public house. . . ."

Gauguin arrived in October 1888 but there was little of the quiet confraternity van Gogh had dreamed of. There were intense discussions about art, visits to the town brothel, presumably a good deal of drinking. Gauguin later wrote, in his recollection of van Gogh's breakdown, ". . . between two personalities, his and mine, one a volcano, the other boiling also, but within, a struggle was in some way brewing." One evening, he says, van Gogh threw a glass of absinthe at him. All was crumbling again for van Gogh. He became more and more agitated.

On December 23, according to Gauguin, van Gogh followed him down the street with an open razor. Gauguin stopped him without any violence. Vincent went home, cut off part of his left ear which he washed, wrapped up and took to a brothel where he delivered it to a certain girl. Gauguin, with his flair for the dramatic, said van Gogh cut off his entire ear.

Van Gogh was taken the next morning to the town hospital where he remained for two weeks. Discharged, he wrote to Gauguin: "I should like you . . ." he humbly asked, "to refrain, until after more mature reflection on both our parts, from speaking ill of our poor little yellow house. . . ."

A month later he was back in the hospital, then let out. But he was soon back again after 30 citizens petitioned the mayor to remove him. After a silence of a month Vincent wrote to Theo asking him not to intervene. He hoped to reassure authorities of his normalcy by being calm and reasonable.

Attaining a "high yellow note"

"If I did not restrain my indignation," he wrote, "I should at once be thought a dangerous lunatic. . . . I will not deny that I would rather have died than to have caused and suffered such trouble. . . . My dear boy, the best we can do perhaps is to make fun of our petty griefs and, in a way, of the great griefs of human life too."

The doctor in charge, he wrote in another heartbreaking letter, thought the crisis had been brought on by bad diet, too much coffee, drink and little food. "I admit all that, but all the same it is true that to attain the high yellow note that I attained last summer, I really had to be pretty well keyed up. . . . I am thinking of frankly accepting my role of madman."

When he had gone out for walks this civilized man, reader of world literature, fluent in three languages, was mocked by street kids, fascinated by this gaunt, bent artist with the bandaged head—now immortalized in his hypnotic self-portraits.

There have been many theories as to just what mental affliction van Gogh suffered from. It has been called schizophrenia, mental instability due to syphilis, epilepsy. One theory had it that he suffered from drinking bad absinthe. Another was that he had turpentine poisoning. Whatever it was, and it has not to this date been given a universally accepted definition, it is clear that his affliction was characterized by periodic attacks of indefinite duration. Between attacks he appeared normal. A typical series of attacks lasted from two weeks to a month. During them he reportedly became violent, tried to swallow his paints and turpentine, and had terrifying hallucinations followed by torpor.

What must be emphasized, however, is that he did not—despite the romantic stories about his hurling himself at the canvas in fits of violent creation, mad with color and exhilaration—paint without thought. His work is the work of a thoughtful artist, planned meticulously for color arrangement and texture, carefully designed, accurately analyzed, color by color, subject by subject, in numerous letters.

It had become clear to van Gogh that he couldn't handle being on his own anymore. At least, in the hospital, he wouldn't have to make decisions, would

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He knew, van Gogh said, that in *Flowering Garden* "not a single flower is drawn completely." Nevertheless, he added, "the impression of all these colors in their juxtaposition is there all right . . . as in nature."

be cared for if there was another attack, which he was sure would come and which he dreaded. At one time, in desperation, he wrote to Theo that perhaps it would be best if he were to join the Foreign Legion. And, too, he said he wanted to be cared for at the asylum of Saint-Paul-de-Mausole, a former 12th-century monastery at Saint-Rémy-de-Provence, situated about 15 miles from Arles.

Yellow shutters for van Gogh

There is little in Arles today to remind you that one of civilization's great masters worked there. The countryside itself, a flat agricultural plain, is not nearly so beautiful, even in the spring, as van Gogh's paintings of it. Perhaps it might be if you had his eye. But, be content, you have his paintings. In the Place Lamartine there is the one-star Hotel Terminus and van Gogh. The shutters of the modest hotel are of the same tone of yellow that his Yellow House was. The shutters are yellow, says Madame Jacqueline Garrigues, proprietor, in homage to van Gogh. There is still the railroad station at which he arrived. There are a supermarket, some nondescript houses and, nearby, the ancient ramparts of the old city. The Yellow House itself is gone, a casualty of bombing during World War II. Cars are now parked where the house once stood. There is a small bronze head of van Gogh in the town gardens. There is a Restaurant le van Gogh on the Rue Voltaire.

Before he left for Saint-Rémy, Vincent wrote to Theo: "Do not be grieved at all this. Certainly these last days were sad, with all the moving, taking away all my furniture, packing up the canvases that are going to you, but the thing I felt saddest about was that you had given me all these things with such brotherly love, and that for so many years you were always the one who supported me and then to be obliged to come back and tell you this sorry tale—but it's difficult to express it as I felt it."

Van Gogh entered the asylum at Saint-Rémy on May 8, 1889, not knowing how long he would be there. He stayed for almost exactly a year in which he alternated between periods of calm lucidity, during which he continued to paint productively, and violent fits during which he had to be kept isolated. "It is queer that every time I try to reason with myself to get a clear idea of things, why I came here and that after all it is only an accident like any other, a terrible dismay and horror seizes me. . . ."

His palette tended to be more subdued but he observed his surroundings with his usual searching accuracy. And, when he wasn't distressed, he continued to paint masterpieces: irises, olive trees, cypresses, landscapes, the garden at the asylum, a starry night which is famous everywhere pictures are known today.

Van Gogh left Saint-Rémy in May 1890. He spent three days in Paris, where he saw the Arles and Saint-Rémy paintings he had sent to Theo together for the first time. The apartment was filled with them, on the walls, stacked, rolled up and piled beneath the furniture. But the crowds of Paris and the clangor made him dizzy and he left for Auvers-sur-Oise, a little village with dirt roads and thatched cottages, recommended by Pissarro because of a doctor, Paul Gachet, a friend of artists and himself an artist, who would look after him. Having met Gachet on his arrival, Vincent wrote to Theo and his wife: "I have seen Dr. Gachet, who gives me the impression of being rather eccentric, but his experience as a doctor must keep him balanced enough to combat the nervous trouble from which he certainly seems to me to be suffering at least as seriously as I."

Van Gogh painted the village, the church, the town hall, the fields, Gachet and his daughter, working on a painting a day, sometimes two. He wrote to Gauguin again, then in Le Pouldu, Brittany, offering to visit with him for a month. Gauguin hedged. He was far from the city, in small quarters, and "for a sick person who sometimes needs a doctor," he replied, "that is dangerous." And, he said, he was planning to leave for Madagascar (a place he never saw).

The brothers continued to correspond. Theo was in trouble with his employers, who had long objected to his promotion of young and experimental artists. Vincent worried about Theo. Theo as always worried about Vincent. ". . . when will there come a happy time for him?" Theo wrote his wife. "He is so thoroughly good."

Van Gogh's paintings mounted up. There was no space for them in the small room at the inn where he lived. He stored them in a shack usually used for goats. No one ever looked at them.

Sadness and extreme solitude

After two months at Auvers without an attack there was a premonition. He painted *Crows Over the Wheat Fields* in July 1890. Here are fields of wheat like caldrons, a maelstrom. Crows in threatening formation, a sort of funereal procession, flap toward the viewers. He painted *The Plain of Auvers under a Stormy Sky*, a wondrous and very sad landscape. "I have not hesitated to express sadness, extreme solitude. . . ." he wrote. In one of the last letters to his brother, found at the time of Vincent's death, he wrote: "Well, my own work, I am risking my life for it and my reason has half foundered because of it. . . ."

Authorities report that on July 27, 1890, he took his easel, paints and a revolver into the fields. He shot

himself. The bullet lodged beneath his heart. He buttoned his coat and walked, stumbling, back to his room. When he didn't appear for dinner the innkeeper went up and found him in bed, face to the wall.

Theo was summoned from Paris. Vincent said, "Missed again! Do not cry, I did it for the good of everybody." The brothers spent the day together, talking. About 1 A.M. Tuesday, July 29, van Gogh died in his brother's arms. Theo wrote: "One of his last words was, 'I wish I could pass away like this,' and his wish was fulfilled. A few moments and all was over. He had found the rest he could not find on earth. . . ."

He had written to Theo from Arles: "Perhaps death is not the hardest thing in a painter's life. For my own part, I declare I know nothing whatever about it, but looking at the stars always makes me dream, as simply as I dream over the black dots representing towns and villages on a map. Why, I ask myself,

In July 1890, only days before his suicide, van Gogh painted his foreboding *Crows Over the Wheat Fields.*

Rijksmuseum Vincent van Gogh, Amsterdam

shouldn't the shining dots of the sky be as accessible as the black dots on the map of France? Just as we take the train to get to Tarascon or Rouen, we take death to reach a star."

After the funeral Theo wrote to his mother: "It is a grief that will last and which I certainly shall never forget as long as I live; the only thing one might say is that he himself has the rest he was longing for. . . . Life was such a burden to him; but now, as often happens, everybody is full of praise for his talents. . . . Oh Mother! he was so my own, own brother."

Theo died six months later. He was 33. The brothers are buried side by side in the cemetery of Auvers.

He had written Theo from Saint-Rémy: "Oh, if I could have worked without this accursed disease—what things I might have done. . . ."

How modest he was. He didn't even know he had done them.

Not in the Metropolitan show, it is one of the few of his canvases in which he expressed his desolation.

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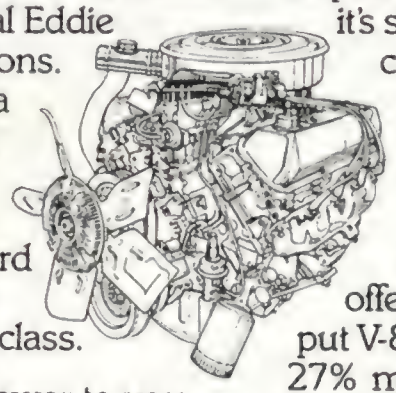

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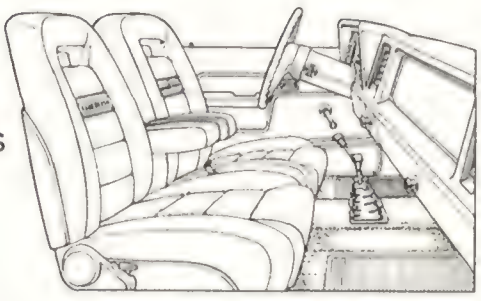

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By Edward O. Wilson

Clockwork lives of the Amazonian leafcutter army

The complex society of these rain forest ants is as precise as a Swiss watch, and it has been running for millions of years

Looking for a particular species of tropical ant in the teeming diversity of the Amazonian rain forest might seem to present a problem, but this was no ordinary ant. I had arrived in Brazil, at a field station of the World Wildlife Fund, to study the leafcutter ant (*Atta cephalotes*). The *saúva*, as it is called locally, is one of the most abundant and visually striking animals of the New World tropics. I had devoted years of research to the species in the laboratory, but had never studied it in the field.

Part of the special fascination of the leafcutters comes from the fact that with the possible exception of a few tropical termites, they alone have evolved the ability to turn fresh vegetation into mushrooms. The evolutionary event occurred only once, millions of years ago, somewhere in South America. It gave the ants an enormous advantage: they could now send out specialized workers to collect the vegetation while keeping the bulk of their populations safe in subterranean retreats. As a result, the 38 different species of leafcutters together dominate a large part of the American tropics. They consume more vegetation than any other comparable group of animals, including the more abundant forms of caterpillars, grasshoppers, birds and mammals.

Leafcutter worker ant, shown 25 times larger than life, grips a slice of severed foliage in razor-sharp jaws.

Leafcutters are also the leading agricultural pests of large portions of Central and South America. A single colony can strip an orange tree or bean patch overnight, and the combined populations inflict more than a billion dollars' worth of damage yearly. It was with good reason that the early Portuguese settlers called Brazil the Kingdom of the Ants.

The field team of the World Wildlife Fund was concerned not with agricultural pests but with the ravages of agriculture on the rain forest. When a piece of primeval forest is set aside and the surrounding forest cleared, it becomes an island in an agricultural sea. The question is, how extensive must the island be to sustain permanently most or all of the kinds of plants and animals protected within its boundaries? As my hosts drove me to a campsite where I could study the leafcutters, they were in the midst of monitoring a series of experimental islands of varying sizes that would be left standing near the edge of the rain forest. It is an experiment that is expected to run into the next century.

The tropical rain forest north of Manaus, like that in many other parts of the Amazon basin, is being clear-cut from the edge inward. It is being removed from the ground like a carpet rolled from a bare floor, leaving behind vast stretches of cattle range and cropland that need artificial fertilization to sustain even marginal productivity for more than two or three years.

Like burning paintings to cook dinner

Although I knew of this in advance, I was still shaken by the sight of newly cleared land around Manaus. The pans and hillocks of lateritic clay, littered with blackened tree stumps, had the aspect of a freshly deserted battlefield. Spherical termite mounds sprouted from the fallen wood in an ill-fated population explosion, while vultures and swifts wheeled overhead, a few remaining representatives of bird fauna that have mostly vanished. Bony white cattle clustered in small groups around the scattered water sheds. Near midday the heat of the sun bounced up from the bare patches of soil to hit with an almost tactile force. It was another world altogether from the shadowed tunnels of the nearby forest, and a constant reminder of what had happened: tens of thousands of species had been scraped away as by a giant hand and will not be seen in that place for generations, if ever. The action can be defended (with difficulty) on economic grounds, but it is like burning Renaissance paintings to cook dinner.

Passing through this desolate zone, we rode in a Wildlife Fund truck to a camp just inside the forest border at Fazenda Esteio, where the biologists were

With saw-toothed jaws, worker shears a leaf; cutting edge is so sharp that ants can slice into shoe leather.

Attracted by smell of freshly cut plant, one leafcutter joins another in sawing through a section of stem.

conducting one of the initial surveys. I savored the cathedral feeling expressed by Darwin when he first encountered tropical forest near Rio de Janeiro ("wonder, astonishment & sublime devotion, fill & elevate the mind"). I could hold still for long intervals to study a few centimeters of tree trunk or ground, finding some new organism at each shift of focus.

The intervals of total silence, often prolonged, became evidence of the intensity of the enveloping life. Several times a day I heard what may be the most distinctive sound of the primary tropical forest: a sharp *crack* like a rifle shot, followed by a susurrant rush and a solid thump. Somewhere a large tree, weakened by age and rot and top-heavy from layers of vines and epiphytes, has chosen that moment to fall and end decades or centuries of life. The process is random and continuous, a sprinkling of events through the undisturbed portion of the forest. The broad trunk snaps or keels over to lever up the massive root system, the branches plow down through the canopies of neighboring trees at terrifying speed, and the whole thunders to the ground in a cloud of leaves, trailing lianas and fluttering insects.

Most of the time I worked with a restless energy to get ahead on several research projects I had in mind. I opened logs and twigs like presents on a Christmas morning, entranced by the endless variety of insects and other small creatures that scuttled away to safety. In the tropical forest, with thousands of mostly unknown species all around, the number of discoveries per investigator per day is probably greater than anywhere else in the world.

As if to dramatize the point, the insect I most needed to find, the leafcutter ant, made its appearance soon after my arrival at Fazenda Esteio, with no effort of my own and literally at my feet. At dusk on the first day in camp, as the light failed to the point where we found it difficult to make out small objects on the ground, the first worker ants came scurrying purposefully out of the surrounding forest. They were brick red in color, about a quarter-inch in length and bristling with short, needle-sharp spines. Within minutes several hundred had arrived and formed two irregular files that passed on either side of our hammock shelter. They ran in a nearly straight line across the clearing, their paired antennae scanning right and left, as though drawn by some directional beam from the other side. Within an hour the trickle expanded to twin rivers of tens of thousands of ants running ten or more abreast. The columns could be traced easily with the aid of a flashlight.

They came up from a huge earthen nest a hundred yards from the camp on a descending slope, crossed the clearing and disappeared again into the forest. By climbing through tangled undergrowth we were able to locate one of their main targets, a tall tree bearing white flowers high in its crown. The ants streamed up the trunk, scissored out pieces of leaves and petals with their sharp-toothed mandibles and headed home, carrying the fragments over their heads like little

This article is adapted from the book Biophilia, *just published by Harvard University Press. The author is one of the originators of the science of sociobiology.*

Successful forager, this worker carries stem to nest; leafcutter can carry load several times its own weight.

In nursery garden of leafcutter nest, the small workers slice up new leaves to grow their "cottony" fungus.

parasols. Some dropped the pieces, which floated to the ground, where most were picked up and carried away by newly arriving nestmates. At maximum activity, shortly before midnight, the trails were a tumult of ants bobbing and weaving past each other like miniature mechanical toys.

For many visitors to the forest, even experienced naturalists, the foraging expeditions are the whole of the matter, and individual leafcutter ants seem to be inconsequential ruddy specks on a pointless mission. But a closer look transforms them into beings of another order. If we magnify the scene to human scale, so that an ant's quarter-inch length grows into six feet, the forager runs along the trail for a distance of about ten miles at a velocity of 16 miles an hour. Each successive mile is covered in three minutes and 45 seconds—about the current world record for humans. The forager picks up a burden of 750 pounds and speeds back toward the nest at 15 miles an hour—hence, four-minute miles. This marathon is repeated many times during the night and in many localities on through the day as well.

From research conducted jointly by biologists and chemists, it is known that the ants are guided by a secretion paid onto the soil through the sting, in the manner of ink being drawn out of a pen. The pure substance has an innocuous odor judged by various people to be faintly grassy, sulfurous or fruitlike with a hint of naptha (I am not sure I can smell it at all). But whatever the impact on human beings, it is a fluid of extraordinary power for the ants. One milligram (a quantity that would just about cover the printed letters in this sentence), if dispensed with theoretical maximum efficiency, is enough to excite billions of workers into activity or to lead a short column of them three times around the world. The vast difference between us and them has nothing to do with the trail substance itself, which is a biochemical material of unexceptional structure. It lies entirely in the unique sensitivity of the sensory organs and brains of the insects as opposed to those of human beings.

One millimeter above the ground, where ants exist, things are radically different from what they seem to the gigantic creatures who peer down from a thousand times that distance. The ants do not follow the trail substance as a liquid trace on the soil, as we tend to think. It comes up to them as a cloud of molecules diffusing through still air at the ground surface. The foragers move inside a long ellipsoidal space in which the gaseous material is dense enough to be detected. They sweep their paired antennae back and forth in advance of the head to catch the odorant molecules. The antennae are the primary sensory centers of the ant. Their surfaces are furred with thousands of nearly invisible hairs and pegs, among which are scattered diminutive plates and bottleneck pits. Each of these sense organs is serviced by cells that carry electrical impulses into the cable-like central nerve of the antenna. Then relay cells take over and transmit the messages to the integrating regions of the brain. Some of the antennal organs react to touch, while others are sensitive to slight movements of air, so that the ant responds almost instantaneously whenever the nest is breached by intruders. But most of the sensors moni-

tor the chemicals that swirl around the ant in combinations that change through each second of its life. Human beings live in a world of sight and sound, but social insects exist primarily by smell and taste. In a word, we are audiovisual where they are chemical.

The oddness of the insect sensory world is illustrated by the swift sequence of events that occurs along the odor trail. When a forager takes a wrong turn to the left and starts to run away from the track, its left antenna breaks out of the odor space first and is no longer stimulated by the guiding substance. In a few thousandths of a second the ant perceives the change and pulls back to the right. Twisting right and left in response to the vanishing molecules, it follows a tightly undulating course between the nest and tree. During the navigation it must also dodge moment-by-moment through a tumult of other runners. If you watch a foraging worker from a few inches away with the unaided eye, it seems to touch each passerby with its antennae, a kind of tactile probe. Slow-motion photography reveals that it is actually sweeping the tips of the antennae over parts of the other ant's body to smell it. If the surface does not present exactly the right combination of chemicals—the colony's unique odor signature—the ant attacks at once. It may simultaneously spray an alarm chemical from special glands that are located in the head capsule, causing other ants in the vicinity to rush to the site with their mandibles gaping, ready to assist.

An ant colony is organized by no more than ten or 20 such signals, most of which are chemical secretions leaked or sprayed from glands. The workers move with swiftness and precision through a life that human beings have come to understand, as far as we do understand it, only with the aid of mathematical diagrams and molecular formulas.

At the end of the trail the burdened foragers rush down the nest hole, into throngs of nestmates and along tortuous channels that end near the water table 15 feet or more below. The ants drop the leaf sections onto the floor of a chamber, to be picked up by workers of a slightly smaller size, who clip them into fragments about a millimeter across. Within minutes, still smaller ants take over, crush and mold the fragments into moist pellets and carefully insert them into a mass of similar material. This mass ranges in size from a clenched fist to a human head, is riddled with channels and resembles a gray cleaning sponge. It is the garden of the ants: on its surface a symbiotic fungus grows which, along with the leaf sap, forms the ants' sole nourishment. The fungus spreads like a white frost, sinking its hyphae into the leaf paste to digest the abundant cellulose and proteins held there in partial solution.

The remainder of the gardening cycle proceeds. Worker ants even smaller than those just described pluck loose strands of the fungus from places of dense growth and plant them onto the newly constructed surfaces. Finally, the very smallest—and most abundant—workers patrol the beds of fungal strands, delicately probing them with their antennae, licking their surfaces clean and plucking out the spores and hyphae of alien species of mold. These colony dwarfs are able to travel through the narrowest channels deep within the garden masses. From time to time they pull loose tufts of fungal strands resembling miniature stalked cabbage heads and then carry them out to feed their larger nestmates.

Virtually the entire leafcutter economy is organized around this division of labor based on size. The foraging workers, about as big as houseflies, can slice leaves but are too bulky to cultivate the almost microscopic fungal strands. The tiny gardener workers, somewhat smaller than this printed letter *i*, can grow the fungus

Stages in the formation of a new leafcutter colony are shown in this schematic illustration. Left to right, queen is inseminated in air, lands, breaks off wings. Burrowing into ground, she spits out fungus, begins new garden, lays eggs to start new colony (above). Small workers carry developing stages of queen's eggs.

On foraging expedition leafcutters ascend from nest, follow the trail to a distant tree, and return with foliage that is turned into fungus to feed colony.

but are too weak to cut the leaves. So the ants form an assembly line, each successive step being performed by correspondingly smaller workers, from the collection of pieces of leaves out-of-doors to the manufacture of leaf paste to the cultivation of dietary fungi deep within the nest.

The defense of the colony is also organized according to size. Among the scurrying workers can be seen a few soldier ants, 300 times heavier than the gardener workers. Their sharp mandibles are powered by massive adductor muscles that fill the swollen, quarter-inch-wide head capsules. Working like miniature wire clippers, they chop enemy insects into pieces and easily slice through human skin. The behemoths are especially adept at repelling large invaders. When entomologists digging into a nest grow careless, their hands become nicked all over as if pulled through a thorn bush. I have occasionally had to pause to stanch the flow of blood from a single bite, impressed by the fact that a creature one-millionth my size could stop me with nothing but its jaws.

At full size a colony contains three to four million workers and occupies three thousand or more underground chambers. The earth it excavates forms a pile 20 feet across. Deep inside the nest sits the mother queen, a giant insect the size of a newborn mouse. She can live at least ten years and perhaps as long as 20. Few have had the persistence to try to determine the true longevity. In my laboratory I have an individual collected in Guyana 13 years before this writing. When she reaches 18 and breaks the proved longevity record of the 17-year cicadas, my students and I will open a bottle of champagne to celebrate. In her lifetime an individual can produce more than 20 million offspring, which translates into the following: a mere 300 queen ants, a small fraction of the number emerging from a single colony in a year, can give birth to more ants than there are human beings on Earth.

The queen is born as an almost invisibly small egg among thousands laid daily by the old mother queen. The egg hatches as a grublike larva, which is fed and laved incessantly by the adult worker nurses through-

Leafcutters zigzag along foraging path, waving antennae to detect pheromones (symbolized by chemical structure) in the ellipsoidal cloud.

out its month-long existence. Through some as yet unknown treatment, perhaps a special diet controlled by the workers, the larva grows to a relatively huge size. She then transforms into a pupa, whose waxy casement is shaped like an adult queen in fetal position, with legs, wings and antennae folded tightly against the body. After several weeks the full complement of adult organs develops within this cuticle, and the new queen emerges. From the beginning she is fully adult and grows no more in size. She also possesses the same genes as her sisters, the colony workers. Their smaller size and pedestrian behavior is not due to heredity but to the different treatment they received as larvae.

Following a heavy rain, the virgin queen comes to the surface of the nest and flies up into the air to join other queens and the darkly pigmented, big-eyed males. Four or five males seize and inseminate her in quick succession, while she is still flying through the air. Their sole function having now been completed, they die within hours without returning to the home nest. The queen stores their sperm in her spermatheca, a tough little muscular bag located just above and behind her ovaries. These reproductive cells live like independent microorganisms for years, passively waiting until they are released into the oviduct to meet an egg and create a new female ant. If the egg passes through the oviduct and to the outside without receiving a sperm, it produces a male. The queen can control the sex of her offspring, as well as the number of new workers and queens she produces, by opening or shutting the passage leading from her sperm-storage organ to the oviduct.

The newly inseminated queen descends to the ground. Raking her legs forward, she breaks off her

wings, painlessly because they are composed of dead, membranous tissue. She wanders in a random pattern until she finds a patch of soft, bare soil, then commences to excavate a narrow tunnel straight down. Several hours later, when the shaft has been sunk to a depth of about ten inches, the queen widens its bottom into a small room. She is now set to start a garden and a colony of her own.

But there is a problem in this life-cycle strategy. The queen has completely separated herself from the mother colony. Where can she obtain a culture of the vital symbiotic fungus to start the garden? Answer: she has been carrying it all along in her mouth. Just before leaving home, the young queen gathered a wad of fungus and inserted it into a little pocket in the floor of her oral cavity, just back of the tongue. Now she passes the pellet out onto the floor of the nest and proceeds to fertilize it with droplets of feces.

As the fungus proliferates in the form of a whitish mat, the queen lays eggs on and around its surface. When the young larvae hatch, they are fed with other eggs given to them by the queen. At the end of their development six weeks later, they transform into small workers. These new adults quickly take over the ordinary tasks of the colony. When still only a few days old, they proceed to enlarge the nest, work the garden and feed the queen and larvae with tufts of the increasingly abundant fungus. In a year the little band has expanded into a force of a thousand workers, and the queen has ceased almost all activity to become a passive eating and egg-laying machine. She retains that exclusive role for the rest of her life. The measure of her Darwinian success is whether some of her daughters born five or ten years down the line grow into queens, leave on nuptial flights and—rarest of all achievements—found new colonies of their own. In the world of the social insects, by the canons of biological organization, colonies beget colonies; individuals do not directly beget individuals.

People often ask me whether I see any human qualities in an ant colony, any form of behavior that even remotely mimics human thought and feeling. Insects and human beings are separated by more than 600 million years of evolution, but a common ancestor did exist in the form of one of the earliest multicellular organisms. Does some remnant of psychological continuity exist across that immense phylogenetic gulf? The answer is that I open an ant colony as I would the back of a Swiss watch. I am enchanted by the intricacy of its parts and the clean, thrumming precision with which it operates. But I never see the colony as anything more than an organic machine.

Let me qualify that diagnosis. The leafcutter colony is a superorganism. The queen sits deep in the central chambers, the vibrant growing tip from which all the workers and new queens originate. But she is not in any sense the leader or the repository of an organizational blueprint. No command center directs the colony. The social master plan is partitioned into the brains of the all-female workers, whose separate programs fit together to form a balanced whole. Each ant automatically performs certain tasks and avoids others according to its size and age. The superorganism's brain is the entire society; the workers are the crude analog of its nerve cells. Seen from above and at a distance, the leafcutter colony resembles a gigantic amoeba. Its foraging columns snake out like pseudopods to engulf and shred plants, while their stems pull the green pieces down holes into the fungus gardens. Through a unique step in evolution taken millions of years ago, the ants captured a fungus, incorporated it into the superorganism and so gained the power to digest leaves. Or perhaps the relation is the other way around: perhaps the fungus captured the ants and employed them as a mobile extension to take leaves into the moist underground chambers.

In either case the two now own each other and will never pull apart. The ant-fungus combination is one of evolution's master clockworks—tireless, repetitive and precise, more complicated than any human invention and almost unimaginably old. To find a colony in the South American forest is like coming upon some device left in place ages ago by an extraterrestrial visitor for a still-undisclosed purpose. Biologists have only begun to puzzle out its many parts, to reflect on its history and ultimate meaning.

By width, largest leafcutter worker is six times the size of smallest, placed on its head for comparison in photo by Darwin Dale. Ants enlarged 3,000 percent.

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Mercury Topaz

By Timothy Green

Apostles of purity, mineral-water buffs swear by the stuff

Europeans have been quaffing mineral waters for centuries, and now a flood of bottled brands is making a huge splash in this country, too

J.-L. Charmet

Earlier devotees celebrated good health in old Evian hall. The statue now graces a public fount (opposite).

Set into the hillside above Lake Geneva in the little French town of Evian-les-Bains is a barred gate secured with a strong padlock. Behind it, a narrow white-walled tunnel burrows into the slope. Farther on, as I discovered on a recent guided tour, the tunnel is blocked by a heavy metal door, like those that secure the watertight compartments in a submarine. After a rattle of keys, the door swings open into a low vault. "This is as far as we are allowed to go, to prevent any contamination of the source itself," said my escort. He bent down to turn a small tap on the side of a gleaming, stainless-steel pipe coming from the heart of the hill. A cool jet of crystal-clear water spurted up.

Such elaborate security precautions for an unobtrusive Alpine spring may seem a bit overdone until you realize that the selling of Evian's natural mineral waters is a very lucrative enterprise indeed. Nearly $120 million is earned annually from the liquid flowing through the stainless-steel pipes in that hillside vault. But that's only a drop in today's booming bottled-water market. Evian is just one of close to a thousand or more companies that are now bottling water all around the world, from Iceland to Uruguay, from the Bahamas to Bahrain.

The French drink more bottled water than anyone else—14.5 gallons a year per person. The Belgians, Swiss and West Germans aren't far behind. They annually quaff around 12 gallons per person. For most Europeans, the idea of drinking water from a bottle, rather than from the tap, is nothing new. Indeed, many European heads of state are accustomed to taking along their favorite brands on trips abroad. Britain's Queen Elizabeth always has Malvern Spring from the Cotswolds on hand, and West Germany's Chancellor Helmut Kohl had supplies of Apollinaris on a recent trip to Moscow. For Americans, however, such indulgences remain a novelty—albeit an increasingly popular one.

In the past few years, bottled water has become the fastest-growing beverage in the United States, far outstripping the soaring popularity of wine. Until 1977, America was, as one water buff put it, "an underdeveloped country." What little bottled water was drunk was usually processed tap water supplied to office coolers. Only a handful of natural American spring waters, such as Deer Park from Maryland and Poland Spring from Maine, were bottled at the source, and only one, Mountain Valley from Arkansas, was distributed nationally. Then an energetic Frenchman, Gustav Leven, President of Société Anonyme Source Perrier, decided that what America needed in place of sugary soft drinks and two martinis before lunch was his sparkling mineral water from an ancient source at Vergèze in the South of France. Leven started spending $4 million annually to promote his beverage from

Modern true-believers sample a spring found in 1789 at France's Evian-les-Bains by a man named Cachat.

Photographs by Ralph Crane and Anthony Edgeworth

To prevent contamination, tunnel leading to Evian's spring is protected by elaborate security measures.

coast to coast. Within three years, Perrier became a cult, spawning jokes like the one about the chap who went into a bar and, thinking he ought to order the latest "in" drink, asked for "a Perrier and soda."

The success of Perrier's American campaign made the owners of many other springs realize that their waters could be merchandised nationwide, too. "Everyone climbed aboard the water wagon Perrier had set rolling," remembers one bottler in Maryland. The timing was perfect. As jogging and health-food stores came into fashion, so did natural waters. The vogue was encouraged, too, by fears of pollution in, and the terrible waste of, some municipal water supplies. One Miami enthusiast, who also happened to be a bottled-water distributor, got so carried away that he organized his fellow water fans into a club called Les Amis de l'Eaux, or Friends of Water. More than 400 people turned up for an elaborate "tasting" at an Italian-style mansion on Biscayne Bay, complete with an eight-piece orchestra, a performing magician and a speaker from Christie's of London.

Today, Americans drink three times as much bottled water as they did in 1976. The annual per-person average is close to four gallons, and consumption is expected to double again by 1990. This year, bottled-water sales in the United States are expected to add up to $800 million, and next year they will probably reach $1 billion.

Fifty-three kinds of bottled water

The scale of the water boom was brought home to me when I crossed from Manhattan to Queens one morning to call on Fred Sipper, an aptly-named entrepreneur who has set himself up as New York's first water broker. I found him in a warehouse surrounded by great stacks of bottled water—no less than 53 different kinds. Sipper used to run a small grocery business in New York. In the late 1970s, his customers started asking increasingly for Perrier and other waters, so he put in a small "water section" on his shelves and soon was outselling the big supermarkets. Before long, he gave up groceries and went into wholesaling after persuading several supermarket chains to open their own water sections.

Prowling the canyons of Sipper's stocks, I realized that waters are rather like wine; you need to be a connoisseur, if not of vintages, at least of locations. In that Queens warehouse alone you could choose among Ramlösa, a sparkling water from Sweden ("By Special Warrants Purveyors to The Royal Court in Sweden and The Royal Court in Denmark," reads the label); Eden, from one of the springs that is the source of the River Jordan in Israel; Highland Spring, from Scotland; and Pedras Salgadas, an effervescent water from

Bathed in light, an elderly visitor takes the waters in sumptuous drinking hall of spa at Italy's famous San Pellegrino. Completed in the early 1900s, Antica Fonte, or "ancient fountain," is still popular today.

Portugal. American waters ranged from Mount Spring Hill and Saratoga from New York, to Cloister from Pennsylvania and Mountain Valley from Arkansas. That was without even counting the better-known European brands, the "chateau bottled" varieties like Badoit, Contrexéville, Evian, Saint-Yorre, Vichy Célestins and Volvic from France; Ferrarelle, Fiuggi and San Pellegrino from Italy; Voslau from Austria; and Apollinaris from West Germany.

Actually, for all their renown, many of the European brands haven't made much of a splash in the American market (imports still account for less than two percent), but Europe is where the long history of Western man's fascination with mineral waters begins. Every source seems to have marvelous legends about the mysterious properties of its waters and the miracles they have wrought on rulers and rascals over the centuries. Both Perrier in the South of France and Ferrarelle, an effervescent Italian water that bubbles out of volcanic terrain not far from Naples, claim that Hannibal quenched his thirst at their sources as he passed by in the third century B.C. on his way to besiege Rome. Roman emperors themselves had a rare addiction to mineral waters both at home in Italy and on their conquests abroad. They established spas in France at Badoit and Vittel, while Julius Caesar took the waters at Vichy, which was known as *Vicus Calidus*—the hot town. Pliny the Elder in his *Natural History* reported not only on the "miraculous waters" of Ferrarelle, but also referred to "a famous fountain

A frequent contributor to SMITHSONIAN, *Timothy Green lives in London, and his article about that city appeared in the November 1982 issue.*

In 1903, Englishman St. John Harmsworth bought a spring in Provence from a doctor named Perrier and built an elegant villa beside it. Today Perrier's water is bottled at a 2,500-man factory located nearby.

in which bubbles sparkle" at what is thought to be the town of Spa, near Liège, Belgium.

Testimonials to delight the modern press agent kept arriving over the centuries. Leonardo da Vinci reportedly bolstered his health with the waters of San Pellegrino in northern Italy and Michelangelo sought relief from the torment of kidney stones at Fiuggi. He sampled the water there and soon wrote: "I am much better than I have been. Morning and evening I have been drinking the water from a spring about 40 miles from Rome, which breaks up the stone. . . . I have had to lay in a supply at home and cannot drink or cook with anything else."

Russia's Peter the Great found that the effervescent waters of Bru in Belgium so eased his indigestion that he gulped 21 glasses each morning. And the German writer Goethe, settling in to sample the local waters at Fachingen, wrote to his daughter-in-law Ottilie: "The next four weeks are supposed to work wonders. For this purpose I hope to be favored with Fachingen water and white wine, the one to liberate the genius, the other to inspire it."

By the 19th century some spas were bottling their waters in earthenware jars and dispatching them carefully packed in straw to the capitals of Europe. Louis Pasteur, the French scientist, regularly sent to Badoit for ten cases at a time. Then an Englishman, George Smith, proprietor of the *Pall Mall Gazette*, chanced to sample the German water Apollinaris, and liked it so well that he negotiated the exclusive export rights during the 1870s. He first made the water popular in Britain, where Edward, Prince of Wales, became a devotee (a smaller split bottle of "Polly," as the Prince called it, was introduced to please him). Then Smith launched it in America, where it became a regular drink in many railroad dining cars (an early wine list from the Rio Grande Western Railway features Apollinaris at 25 cents a pint). When Prince Henry of Prussia dined at the White House on an official visit in 1902, Apollinaris was duly served.

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Recovered bottles piled up outside Perrier plant are pulverized and then melted down to make new ones.

Timothy Green

An inspector checks the flow of a new test well at Ferrarelle's effervescent spring just north of Naples.

British newspaper proprietors, meanwhile, took quite a fancy to the mineral-water game. St. John Harmsworth, the younger brother of Lord Northcliffe, who founded the London *Daily Mail*, tasted the waters of a spring operated by a Dr. Perrier while vacationing in the South of France. The next year he sold his shares in the family publishing business to buy the spring and devoted the rest of his life to building its reputation. After he was injured in an auto accident in 1906, which left him paralyzed from the waist down, he had the idea of putting Perrier into the now-familiar bottles shaped like the Indian clubs with which he exercised to regain strength.

The railway age, which made it easier to distribute waters, also enabled the wealthy to travel long distances to take "cures" at their favorite mineral-water spas. Grand hotels were built with casinos, theaters and ornate drinking halls in which to sip graciously and promenade. The spas became an important part of the social scene.

The faded grandeur of that era can still be seen at San Pellegrino (whose water may be found as readily as pasta in every Italian restaurant in New York), tucked away in a mountain valley northeast of Milan. The drinking hall, with five fountains cut into the rock at one end, is paved with marble and adorned with neoclassical murals. The casino alongside has mother-of-pearl windows and great chandeliers above a sweeping staircase fit for some Hollywood musical. The chandeliers are made of crystal from Milan. The emblem prominently displayed above the painting at the top of the staircase is the official insignia of San Pellegrino. The paintings on the ornate ceiling, representing the four seasons of the year, were done by artist Francesco Malerba. The entire setting is bathed in the glorious light of stained-glass work by Giovanni Beltrami. In this spectacular atmosphere, the great Italian film director Federico Fellini chose to make a movie with his wife, actress Giulietta Masina, called *Juliet of the Spirits*.

Living it up at the Grand Hotel

At the turn of this century, the weekly *Giornale di S. Pellegrino*, listing who-was-who in each hotel, was a social register. At the Grand Hotel in July 1907 were to be found the Marchese Cuttica di Cassino, Contessa Cià Cittadella Giusti, Barone Arturo Pelka, the Austro-Hungarian consul from Florence, Principessa Sofia di Trabia of Palermo and even Mr. and Mrs. Crafton Smith from England.

Taking the waters at fashionable resorts was not just a European fetish. Americans, too, discovered "healing springs" to which everyone from Presidents to world-heavyweight boxing champions flocked. The

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reputation of Saratoga Springs, New York, already renowned among the Mohawk Indians, was established first. Saratoga offered two waters: one slightly saline, which was supposed to be a good laxative, the other alkaline and thus a boon to digestion. George Washington and Alexander Hamilton were among its early patrons. Saratoga ran into some strong competition after 1844 when a fellow named Hiram Ricker, out cutting hay on a hot day at South Poland, Maine, chanced to quench his thirst from a spring normally used by his cattle. He found it eased his chronic dyspepsia. Soon the whole neighborhood vowed Poland Spring worked wonders for them, too. Ricker took to advertising that the water "Cures Dyspepsia! Cures Liver Complaints of Long Standing! Cures Gravel! Drives out all humors and Purifies the blood." He built a bottling plant and a 100-room resort hotel with gilded turrets and domes. He even added a golf course. American and European socialites came to South Poland in droves.

Stiff competition was offered, too, by Hot Springs, Arkansas, whose waters were also originally praised in Indian legends for their healing powers. By the 1880s, Hot Springs had blossomed as a resort. A contemporary guidebook lauding its benefits burbled, "The beautiful ladies, and those who would be beautiful, come to the waters of Hot Springs. Those who have ruined their complexion by excessive use of cosmetics will renew beauty and youth and regain soft, fair and clear complexion. Those who feel the heavy hand of time being placed upon them, and their looking glass reveals wrinkles and mole patches, can by bathing and drinking these waters so improve their complexion as to appear several years younger than their actual age."

Hearst and Canfield boost water sales

While would-be beautiful people wallowed in the thermal baths, the cool water of a nearby spring was bottled. Christened Mountain Valley, it was dispatched around the nation. Sales got a considerable boost in 1908 after a chance meeting in a railroad dining car between publisher William Randolph Hearst and gambler Richard Canfield (whom Hearst's newspapers were trying to put in jail). Both men produced bottles of Mountain Valley from their luggage to drink at dinner, agreed they were addicted and promptly set up a joint venture to market it.

Mountain Valley's coup, however, was to establish itself as the drink of Presidents. "We've supplied the White House since the days of Calvin Coolidge," Mountain Valley's John Scott told me a short while ago. "President Eisenhower once told a press conference held after his heart attack that he was drinking Mountain Valley on the advice of his doctors. And recently Ronald Reagan took it along on his trip to Japan and South Korea."

Mountain Valley claims that the 50 gallons of water bubbling up from its spring every minute actually fell as rain 3,500 years ago. Geological tests apparently have shown that it has taken that long for rainwater to sink through layers of shale, sandstone and limestone into an underground source from which it then rises to the surface through a fault. Such an ancient "vintage" goes far beyond the longevity proposed for other waters. Evian, for instance, believes at least 15 years elapse before rain and snow falling on the French Alps is filtered down into the sandy bed trapped between two layers of clay that provides its

'Taking the waters' in posters and pictures

Beverage was served up royally in 1925 ad for Evian's hotels.

Something a little stronger spiked German water's pitch.

Copelina's señorita set table, but would it hold water?

source. "Our flow varies slightly," Evian's Pierre Chardon told me, "and we've discovered that it's tied to the weather of 15 or 20 years ago."

Whatever the weather, the mineral components of most waters hardly vary. "We've taken daily samples for more than 100 years, and the mineral content is always the same," Chardon says, adding: "We *never* pump because that might force the water being filtered down from the mountains to descend too quickly." Like a good wine, Evian must mature over the years.

To preserve the natural purity of the water, the maximum daily flow that may be bottled at Evian, and at the other natural mineral-water sources officially recognized in France, is carefully regulated by the Ministry of Mines. The quality of their water is also initially approved and constantly supervised by the Ministry of Health. Indeed, the full classification of a mineral water "in the public interest" is accorded to only 36 sources in France. Similar controls are exercised in Belgium and Italy. The regulations, like those for *appelation contrôlée* in wines, are strict. Bottling must be done right at the source under conditions of meticulous sanitation.

At Perrier the bottling plant is close to the small pavilion in the formal gardens of the villa, originally built by St. John Harmsworth, where the sparkling water bubbles up at a steady 21,000 gallons per hour. In the 19th century, the bottling was done right beside the source, with an inevitable loss of carbonation in the process. Now, to control the amount of efferves-

Another girl and another glass of water, this time from Bohemia.

In an engraving that dates to 1860s, visitors congregate in Vichy's spa.

Pierrot cavorts on fizzing bottle in Spa-Monopole's familiar image.

For Vittel, the nimble maiden proclaimed relief from arthritis.

With a name like Fred Sipper, this New Yorker is in the correct business—he's a mineral-water distributor.

cence in each bottle, the water and gas are tapped separately and then reincorporated at the bottling plant. Every day, 450 tons of sand are delivered to one end of the vast assembly line to be made into green club-shaped bottles. The plastic bottles used by Evian, Contrexéville and other still waters (sparkling Perrier cannot go into plastic containers) are also made at their factories to eliminate risk of contamination. And under no circumstances may soft drinks be bottled in the same plant for fear of sugar bacteria finding their way by mistake into the water.

At Evian the quality control is so intense that visitors may view the bottling operation only from a sealed gallery. The entire bottling area is slightly pressurized to keep out germs. Workers who have colds, mild infections or cuts are not allowed in; they spend the day tending the lawns and gardens around the factory, which are consequently immaculate. Fine gardens are not limited to the factory itself. Nearly a century ago, when the waters were first bottled, the company agreed to pay the town of Evian-les-Bains a 1.5-centime royalty on every bottle sold. Today, with Evian selling 600 million bottles a year, the royalty meets most local tax needs. It even enables this town of 6,000 inhabitants to employ a hundred gardeners who maintain its reputation as the most flower-filled community in France.

The concern for purity occasionally causes Europeans to question more informal U.S. practices. "I'm told some American waters are actually taken long distances in tanker trucks from the spring to the bottling plant," says Evian's Pierre Chardon, with evident Gallic disdain. "That would *never* be allowed in France."

Marketing experts appreciate the subtle distinction between European and American motives for drinking bottled waters. "Europeans drink them for what they contain in the way of minerals," explains Ron Davis, Perrier's man in America. "Here, they are consumed for what they do *not* contain." Perrier goes out of its way in the United States to stress that its water is salt-free, caffeine-free, saccharin-free, sugar-free and has no additives or preservatives.

That theme is reversed in Europe. Chic Frenchwomen regard Contrexéville as a diuretic for slimming, while both Evian in France and San Gemini in Italy are recommended for making up baby formulas. Vichy Célestins, which has an extremely high level of bicarbonates, is noted as an aid to digestion, while Apollinaris, in West Germany, emphasizes that the unique blend of magnesium, sodium and calcium found in its sparkling water supplies much of the body's daily mineral requirements.

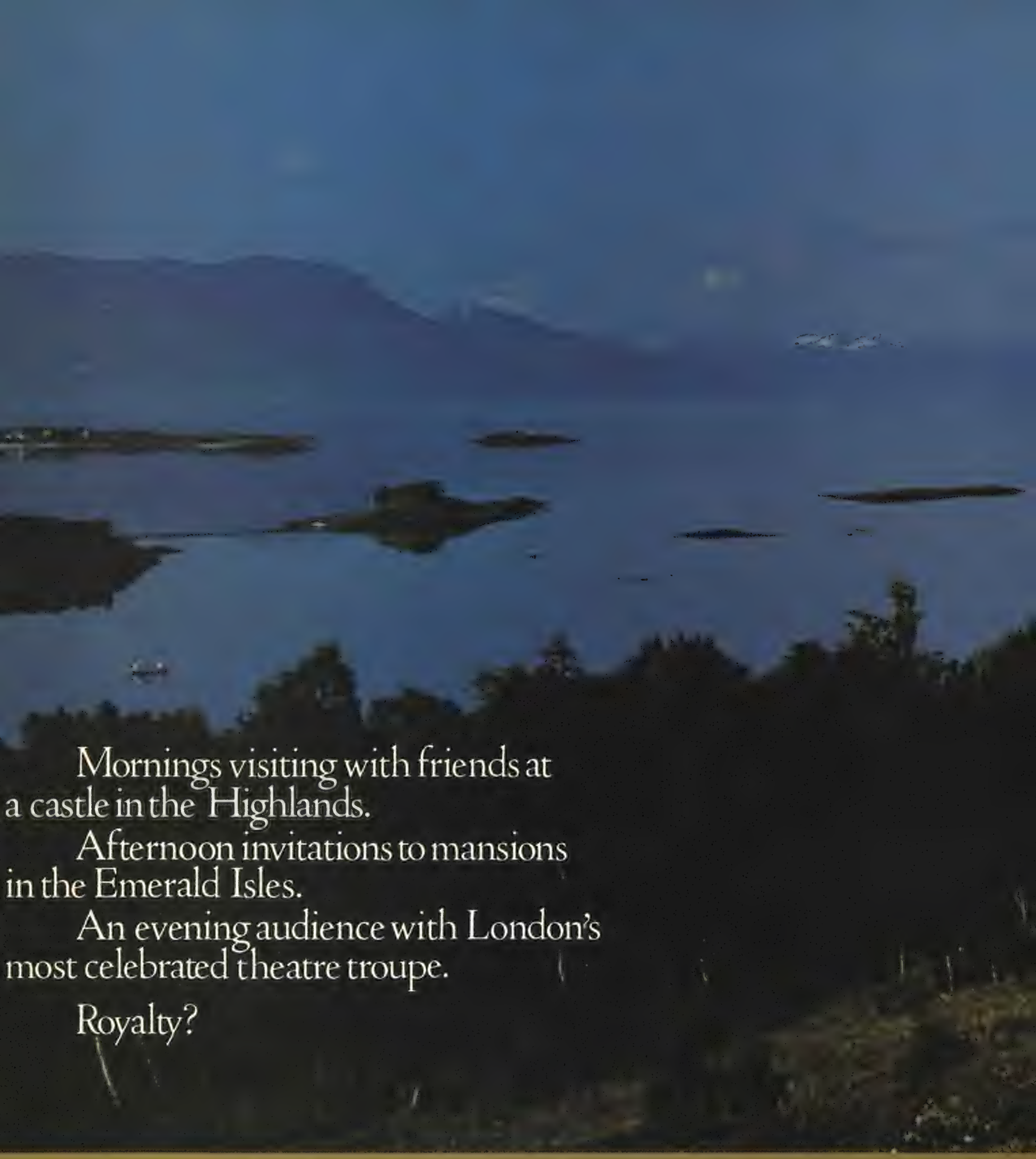
These days, Europeans are worrying about how to hold on to their slim share of the growing American thirst. Their headache is the cost of shipping the water. Bottles sent from Europe cannot compete in price on a supermarket shelf in Dallas or Los Angeles with water bottled at a local spring. It can sell only if people are ready to pay a premium for the name. Consequently, the real growth potential, gallon for gallon, is in locally bottled U.S. water.

Even at that, the Europeans have not been frozen out. Perrier's American company, Great Waters of France, bought up Poland Spring in Maine in 1980 and has already quadrupled sales. The same company has also snapped up Calistoga, a California water that gushes from an old geyser in the Napa Valley, and Oasis, a Texas company bottling processed water.

Perrier's lead has been followed this year by another French group, Vittel, which is laying out about $3 million to purchase Bartlett Springs, just north of San Francisco, and open a bottling plant there. Getting in on local ground will enable Perrier and Vittel to stay with the water boom by offering a less expensive brand alongside their own "chateau bottled" varieties.

Who knows? More and more Americans may soon be echoing Paul Bordier, president of the European Union of Natural Mineral Water Sources, who told me not long ago: "Why not drink a bottle a day of marvelous water if it costs only about as much as your daily newspaper?"

In lavish Art Nouveau casino next to San Pellegrino spa, some who take the waters may, in turn, be taken.



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By Madeleine Jacobs

A new Secretary takes charge at the Smithsonian

An archaeologist and outdoorsman, Robert McCormick Adams is equally at home on a desert dig or in an administrator's office

Dressed in blue jeans, a checked shirt and a decal cap, Robert McCormick Adams picks his way surefootedly up Seven Castles Creek in the Colorado Rockies. Shapur, his charcoal-gray poodle, follows his master's lead as they negotiate high water, rock, debris and soft spots in the muddy banks.

Seven Castles Creek is an alluring place. On either side of the stream tower the "castles," a formation of red-sandstone bluffs carved over the eons by ancient rivers; in the distance, a waterfall beckons. But only a few weeks earlier the creek, fed by heavy spring rains, had come roaring down the hillside, crashing over its banks and washing out a tiny, nameless bridge that connects Adams to the rest of Fryingpan Valley. It was not the first time that the creek had jumped its banks, leaving Bob Adams and his wife, Ruth, stranded for days. "The creek looks innocent enough now," he worries out loud, "but we'll have a problem with the next flood when this stuff comes down the mountain."

In Colorado, as in all arid lands of the world, water carries both the promise of life and the power of destruction. It is a double-edged force that is never far from the mind and psyche of Adams. Nearly his entire adult life has been devoted to divining the patterns of settlements that rose and fell in Mesopotamia over the course of six millennia in the floodplain of another body of water, the Euphrates River.

At this moment, however, Adams is less concerned with the grand design of distant civilizations in far-removed corners of the world than he is with the more mundane matter of whether to water the wild flowers planted by his wife around the red-sandstone-and-wood house he built himself in his own small corner of the world. The spare, cedar-paneled, five-room cabin hugs the top of a 13-acre hillside wedged between national forest and state lands, four miles from the nearest village, Basalt, and 22 miles northwest of Aspen. Surveying the overcast sky, Adams decides to delay watering, a decision vindicated by the soaking rains which arrive later that evening.

Robert Adams, who became the ninth Secretary of the Smithsonian Institution on September 17, moves back and forth easily between these two worlds. In fact, he enjoys moving in and out of many different worlds—or "scenes," as he calls them—each with its own internal dynamics. The many worlds of Adams have included the University of Chicago, where he was a student, archaeologist, educator and administrator; the nation's capital, where he has been active in the National Academy of Sciences and National Research Council; the deserts of the Near and Middle East and the cloud-forested mountains of Chiapas, Mexico, where he has carried out field research over a period of 27 years; and the mountains of Colorado, where he does much of his writing and relaxing in his hilltop house. Taken together, these scenes form a nexus that defines the man: a scientist and a humanist whose global perspective of civilization—its arts, science and history—is tempered by a deep understanding of nature. He is, in the words of colleagues, friends and family, a serious, self-disciplined scholar and intellectual who understands where the humanities, arts and sciences come together. He is also a man with a hint of Indiana Jones in him—an outdoorsman who knows how to do things with his hands and who has led something of a knockabout life in unexpected places.

In his natural habitat, Robert McCormick Adams surveys Seven Castles Creek near his Colorado home.

Books, football and the outdoors

Adams was born on July 23, 1926, in Chicago, to Robert McCormick and Janet Lawrence Adams. The elder Adams was an ardent Republican, a successful tax attorney and a direct descendant of one of the two daughters of Robert McCormick, father of reaper inventor Cyrus H. McCormick. Janet Adams, an equally ardent Democrat who was and is active in civic and social causes, counted in her family several notable diplomats and attorneys.

As a boy, Janet Adams remembers, her son was "always very, very busy"—an avid reader who also en-

Photographs by Chad Slattery

joyed football, crew and the outdoors. In 1943, at age 17, he enrolled as a physics major at MIT. Almost at once, Adams recalls, "I had the feeling that physics wasn't where I belonged." As his interest declined, the Navy, in which he had enlisted as an engineering officer candidate, quite reasonably transferred him to boot camp as an apprentice seaman. By the time he completed training in electronics, the war was over. The young radio technician third class was shipped off to Shanghai, where part of the Pacific fleet was stationed. The stay in Shanghai was a turning point.

"Shanghai in those days was a truly great city, you knew that instantly," he remembers vividly. "It was a city in the throes of gross contradictions—great wealth, despotism, small-scale entrepreneurs trying to get rich, corruption, vice, the black market, opium dens, the fleet coming in ready to tear apart anything they saw, refugees who had wound up in Shanghai on the eve of the war and were still there. It was one of those scenes that deserved a great novelist and never got one. And if anything ever decided me against going back into physics or engineering, it was that experience."

That experience included a stint on shore patrol—a woefully small core of Navy professionals supplemented with assorted sailors like Adams, who at six-foot-two at least *looked* the part. After four months of fighting his way into bars to haul out errant sailors, he was reassigned to a destroyer on patrol along the China coast. When he was discharged in the spring of 1946 he learned that summer jobs were available in Aspen, then a rural Colorado town of a few hundred residents. A group of investors envisioned Aspen as a prototype of a European-style intellectual community for the arts, music and education; skiing would provide the financial base to make it work. Trails had to be cleared for the ski lifts, and Adams spent the next two summers high above Aspen with bucksaw and ax. After working nonstop for a few days, he and a friend would pack their rucksacks and head for the snow-covered basins at 13,000 feet for a few days of late-summer skiing. For a young man just back from the service, it was true freedom: Colorado was at once—and for always—in his blood.

Another nearly 40-year association began in the fall of 1946, when Adams entered the University of Chicago. He was drawn to courses in anthropology, history and political science, but he also toyed with the idea of becoming a journalist. It seemed to the budding reporter that "there was a whole world out there I didn't know anything about," and in the spring of 1949 he once again dropped out of school. He moved to industrial South Chicago and went to work first at a Ford assembly plant, later at a United States Steel mill. American industry in those days was a symbol of a nation and its people on the move. Adams remembers being "almost choked up with pride at the fumes coming off the refineries and the stacks of the steel mills belching smoke." Those were heady days, learning firsthand about America's industrial heartland.

While still working at the steel mill, Adams once again began taking courses at the university, where he came to the attention of archaeologist Robert Braidwood, who enlisted him for an expedition to the Near East. In September 1950, Adams found himself at a site known as Jarmo in the remote foothills of Iraqi Kurdistan. There, the Braidwood working party of five Americans set up camp, built a mud house and installed a generator; using his Navy training, Adams rigged up the electrical wiring.

The aspiring archaeologist adjusted easily to life in Iraq. Out on the mound all day supervising the excavation, he had to pick up enough Arabic to communicate with local Kurdish workmen and the contingent of specialized Shergati pickmen. He recalls attending weddings and visiting villages in the isolated Kurdish mountains, and going off to retrieve one of his best pickmen from the local "curer" who had been called upon to bring the pickman out of a recurring deep depression. That was "true anthropology," Adams says with a smile.

Adams left Jarmo in the spring, returning to Chicago by way of some intensive rock climbing in Austria. Back at the university and now firmly committed to anthropology and archaeology, he met Ruth Salzman Skinner, a young Californian transplanted to the Windy City by way of Minnesota with her two preschool daughters. A competitive freestyle swimmer with a love of music, anthropology, law, politics and

Madeleine Jacobs, who is chief science writer for Smithsonian News Service, reports frequently on the research activities of Institution scientists.

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George Gerster

In Iraq in 1967, Adams (center) and his colleagues launch kitelike Jalbert parafoil to carry a camera aloft. Adams helped to pioneer this technique for making low-level aerial photographs of archaeological sites.

the outdoors, she shared his enthusiasm for philosophical and intellectual discussions on any and all subjects. They were married two years later.

Meanwhile, Adams had begun work on his master's thesis based on work at Jarmo, which had been an agricultural settlement in the 8th and 7th millennia B.C. But an expedition in 1953 to an ancient Maya city on the Yucatán Peninsula turned his thoughts to the topic that has occupied him ever since: cities and their dynamics in the rise and fall of civilizations.

In 1956 he led an expedition to the northern part of the Mesopotamian plain, an area known to the ancients as Akkad. There he would build on a 20-year-old discovery, as yet unexploited, by archaeologist Thorkild Jacobsen. On the assumption that people would live within a reasonable distance of their water supply, Jacobsen had concluded that ancient sites on the Diyala plains of north-central Iraq must lie close to their life-giving watercourses. By plotting the position of these settlements on a map, he could discern the approximate courses of long-vanished streams and irrigation canals. Using this approach, Adams planned a survey of the ancient river courses and settlement patterns in Akkad from the period 3000 to 1500 B.C.

In Akkad Adams and a colleague, Vaughan Crawford, and their driver lived in the desert for ten days to two weeks at a time wherever they could lay out a sleeping bag. When they ran out of food and water they drove back to Baghdad, unloaded their sherds, talked with the national director of antiquities, stocked up on supplies and headed off again. On one of these runs to Baghdad, Adams met geologist Stuart Harris and through him had his first access to aerial photographs of Iraq. They astounded Adams. Taken from thousands of feet above the desert, the pictures clearly revealed faint traces of individual watercourses, even superimposed sequences of watercourses, dating back to remote times. From that moment, the concept of a different kind of study came to him, and aerial photographs were to be a part of it.

Iraqi officials approved plans for a major study of ancient agriculture under Jacobsen's direction. As part of that project, Adams returned in the fall of 1957 to use aerial photographs for a survey of the

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At their Basalt retreat, the Adamses receive a friendly visit from Shapur, their four-year-old king poodle.

Diyala plains, where the government was considering investing in a major new irrigation system. The entire Adams family—which had grown with the birth in 1955 of another daughter, Megan—moved to an old expedition house on the edge of the Diyala mounds northeast of Baghdad. The older girls, Gail and Beth, then 10 and 8, traveled by truck and rowboat to a local Iraqi elementary school; Ruth worked with the tons of objects collected during the survey.

Adams set out each day with his Land Rover and local guide, Meryush Jacata, a semi-Bedouin who became a close friend. Occasionally Gail would accompany them, a real adventure since the desert could be a frightening experience if the car broke down. "Bob always made us feel like we were doing something important," Beth says, "even when we did something awful. Once, we were digging in an area where we had been told not to and we brought him back a complete pot. We were so proud of ourselves! Bob *never* loses his temper but you know when he disapproves. He calmly explained to us why we shouldn't have dug it up and made us take it back and bury it again."

The survey revealed development of the region from the scattered layout of ancient hamlets, villages and towns with their incipient canal systems to the growth of true cities and the remaking of the desert landscape with sophisticated canal systems. "Well before A.D. 1000," Adams says, "the people were reshaping natural drainage lines and bringing major canals under and over rivers—a true engineering feat." No one had previously identified accomplishments of this complexity. He had planned to forge ahead with a survey of the entire plains, but those hopes were dashed by the revolution which arrived on July 14, 1958, when Iraqi military forces overthrew the already shaky monarchy.

Making a survey at 120 degrees

Since the early Sixties, Adams has returned to Iraq whenever official policies toward his surveys have permitted. There have been many frustrating moments, but by his own admission he has never despaired of returning. To do so would be distinctly uncharacteristic of a man who, friends say, stays with something until it is finished, no matter how long it takes. Of the land nearest and closest to him professionally, Adams says matter-of-factly, "Iraq is like a wonderful laboratory whose door is out of my control and it episodically swings open and shut."

During years when the door was open, he was able to expand and refine his earlier work, completing two surveys that, along with the insights of other archaeologists, have revolutionized the understanding of the rise of urban societies in Mesopotamia.

In 1968, Adams, Ruth, Beth and Megan returned to Iraq to begin a monumental survey of the central Euphrates floodplain conducted off and on between wars for the next seven years, including what he calls "the most hellish piece of work I ever did," in the summer of 1973. On that trip, he and his driver were stranded in 120-degree weather 20 miles beyond the desert edge when their overheated Land Rover quit as they were traversing a sand dune. They managed to escape by building a crude roadway across the dune out of bricks from a nearby mound. Today, he admits sheepishly, "nobody in his right mind would survey in the middle of August in southern Iraq."

The survey was completed in 1975 and Adams pulled together the big picture from more than 1,600 sites in his book *Heartland of Cities: Surveys of Ancient Settlement and Land Use on the Central Floodplain of the Euphrates.* In this culminating work he paints a detailed, at times lyrical, portrait of previously unknown long-term cycles of population growth, decline and outright abandonment over a period of 6,000 years—cycles accompanied by major

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changes in the complexity of irrigation systems, the nature of urban life and the size of major urban centers. Like many discoveries, the surveys raise additional questions that he would love to pursue should the door swing open again.

The door to Iraq has been shut more often than not, but Adams has not lacked for things to do. Indeed, some might call him a workaholic; he himself concurs that he enjoys leading a "working life." Of this there can be no doubt: he is a goal-oriented man whose work—whatever it may be at the moment—takes priority over everything else. Besides carrying out field research in Iran, Syria and Saudi Arabia, he has traveled on scientific missions to Europe, the People's Republic of China and the Soviet Union. And he has been deeply involved in administrative life at the University of Chicago as director of the Oriental Institute for eight years, as dean of the Division of Social Sciences and as provost. He is a trustee of the National Opinion Research Center and the Russell Sage Foundation, and is currently one of two candidates for president-elect of the American Association for the Advancement of Science.

Since the late 1960s, Adams has also devoted increasing energy to the National Academy of Sciences and its National Research Council, where he has been committed to breaking down the barriers between those in the natural sciences and in the humanities. Adams has been effective in doing this, says one close associate, because he is "an enormously curious man with an open mind."

There is no question in Adams' mind that the Smithsonian has a key role to play in maintaining such a dialogue. Adams sees the Smithsonian as "a unique institution with an opportunity to be a focal point for the scientific and intellectual life of this country and the community of scholars abroad." The Smithsonian, he maintains, "is also a shining constellation of museums spanning the arts, natural sciences and technology, with the responsibility to use these resources for the cultural enrichment and education of the nation. To do so, the Smithsonian must be a center of excellence for research across the full spectrum of human knowledge, with emphasis on areas that distinguish the Institution."

When Robert Adams was unanimously selected by the Smithsonian's Board of Regents from a field of 300 candidates to be the new Secretary, one local paper in Fryingpan Valley trumpeted the news thus: "Part-Time Local Makes Good." The headline drew a hearty laugh from the normally reserved Adams, and it is a measure of the man that while he is serious about his work, he never takes himself too seriously. "His sense of humor is with him all the time," his wife says, "which means he never takes offense."

Nor does he worry that he is only the ninth person to guide the world's largest museum complex in its 138-year history. The most interesting things he's had to do in his life, he says, "involve making connections between things," whether those things have been writing books or building the house in Basalt, a project he and a carpenter friend carried out without plans. "There were times when figuring out construction details commanded every intellectual resource I could summon," he says. The Smithsonian is also new turf, but Adams has been an enthusiastic traveler in uncharted territory most of his life.

Adams expects that his life with Ruth will change very little. They will continue to ski, explore old mine dumps, backpack and collect minerals when they visit their Colorado cabin. She will continue to swim each day when possible, and write, lecture and speak out on issues concerning science, technology and women, although she is giving up her long-time editorship of the *Bulletin of the Atomic Scientists.* He will continue to collect old maps and write poetry—for his eyes only. The Adamses will still vacation in new places like the Galápagos islands, visit their daughters and their grandson, and spend quiet evenings reading, talking or visiting with a few close friends. Indeed, about the only major changes in their family life-style will be for Shapur, who is used to roaming the University of Chicago campus. That, Adams admits, will probably have to change. But it is safe to say that Shapur's master will feel as much at home in the red-sandstone Smithsonian castle as he already does in the red-sandstone mountains of Basalt.

Before a massive stone fireplace he built himself, Robert and Ruth Adams catch up on their reading.

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By Lionel Casson

And never say no: politics as usual in ancient Rome

Though they used Latin and wore togas, candidates begged, bought and bamboozled voters in ways all too familiar today

"Now let's look at the polls," wrote Cicero to a friend on July 27, 54 B.C., the eve of an election. "Bribery's thriving. I'll give you a sign: since July 15, the interest rate has doubled. . . . Caesar is backing Memmius with all his might . . . in a deal I don't dare put in writing. Pompey is fuming and growling and backing Scaurus, but who knows whether as a front or for real. None is ahead; their handouts are keeping them all even." Cicero was only half joking. In the politics of this age no holds were barred.

Politicians in Rome got more chances to run for office than ours do today, since in most cases the term of office was just a year. The election Cicero was talking about was for the consulship, the highest office in the land, the equivalent of our Presidency. And here two candidates stood to win, since the law called for a pair of consuls, a joint presidency, as it were. On the other hand, once elected, they had to wait ten long years before being allowed to run for a second term.

In Cicero's day, consular hopefuls behaved as politicians always have and forever will: they made themselves as visible as possible, were charming to all potential voters and promised everything to everybody. The rules of the game are spelled out in a how-to-campaign document for Cicero's use that his brother drew up in 64 B.C. It must have worked because Cicero, a small-town boy who started with no backing and not much money, managed to gain entrée into the highest political circles and even got himself elected consul.

"Take care," his brother wrote, "to have followers at your heels daily, of every kind, class, and age; because from their number people can figure out how much power and support you are going to have at the polls." He further counseled, "You particularly need to use flattery. No matter how vicious and vile it is on the other days of a man's life, when he runs for office it is indispensable." As for getting votes among the rank and file, "that requires calling everyone by his name . . . make it clear you know people's names . . . practice, get better at it day to day. Nothing seems to me better for popularity and gaining favor." And never say no: "If you make a promise, the matter is not fixed, it's for a future day; and it affects only a few people; but, if you say no, you are sure to alienate people right away and a lot of them."

Cicero *frère* was firm on another point, too: don't neglect a single solitary voter anywhere. "Take into account the whole city [of Rome]," he wrote, "its organizations, suburbs, neighborhoods; if you get the community leaders on your side, through them you'll easily have the rest, the rank and file, in your hands. Next, imprint on your mind and in your memory the whole of Italy . . . don't let there be a single municipality, colony or prefecture, in a word, any place at all in Italy, in which you do not have satisfactory support." Votes garnered at the Roman equivalent of whistle-stops, in other words, were as vital as those acquired in Rome. During one campaign Cicero was ready to go all the way to Gaul—providing a scheme to do it at government expense worked.

"Politicians behaved as they always have: they made themselves visible, promised everything to everybody."

A toga was like a three-piece suit

Then as now, dress counted. A candidate went around in a toga, which was not every Roman's everyday costume, as is generally thought, but rather the equivalent of a conservative three-piece suit and tie. And he made sure that it had been freshly laundered to shiny whiteness—he was *candidatus* (i.e., gleamingly whitened)—our word comes right out of this Roman campaign practice.

Thus immaculate, he would head for the forum, Rome's main square, with, as Cicero's brother advised, a clutch of hangers-on at his heels—men who, in return for their keep, were available on call to beef up his retinue. They were called *sectatores* (followers) and were an essential component of visibility. Not having enough *sectatores* was as damaging to a Roman politician as not having enough television time is to a politician today. A key member of a candidate's campaign

Illustrations by W. B. Park

Running for office in ancient Rome

"In pre-television, pre-radio, pre-printing-press days, campaigning had to be done by personal contact."

team was his *nomenclator* (name caller); as the procession came abreast of potential voters (adult male citizens—women were citizens but had no vote), it was his job to whisper their names to the candidate so that they would have the inexpressible pleasure of a personal greeting from the great man.

In those pre-television, pre-radio, pre-printing-press days, campaigning had to be done by personal contact. A candidate went to the places where men tended to congregate, especially the forum, and made a circuit, an *ambitio* (a going around) as it was termed (our word "ambition" was originally just the drive to get elected). In the process he carried out a *prensatio* (grasping), the buttonholing of voters—or whatever you did to buttonhole a man in a tunic or toga—in order to harangue them on the ineffable benefits of voting for him as against his *competitores* (fellow seekers) of office.

There were no campaign posters in ancient Rome; writing materials were far too expensive. But there was the next best thing, notices painted on walls facing the streets; those appeared all over town around election times. In Rome itself, which has been lived in continuously, they have disappeared, the walls they were on having long ago crumbled or been dismantled. However, you can get an idea of what they were like from Pompeii where, thanks to the sudden extinguishing of the city by a rain of volcanic ash, the walls still stand and here and there electioneering messages can still be read on them.

Some are in the scrawl of casual enthusiastic supporters, others in the handsome lettering of professionals, paid announcements as it were. Pompeii was just a small town compared with Rome, so the notices are all on small-town level, about election to the local offices such as *duumvir* (mayor) or *aedilis* (commissioner of markets) and the like. Some are short and staccato, like our bumper stickers: "M. Holconius Priscus for *duumvir*," "Casellius for *aedilis*." Some beat the drum a little louder: "Publius Carpinius—a good man. I appeal to you: make him *duumvir*." Some are private endorsements: "Genialis appeals to you to elect Bruttius Balbus *duumvir*. He will be the watchdog of our treasury"—which is not too free a translation of *hic aerarium conservabit* (he will preserve the treasury).

Many are organizational endorsements—from the sort of organizations to be found in a small town: "The goldsmiths to a man appeal to you: Gaius Cuspius Pansa for *aedilis*"; "Marcus Holconius Priscus for *duumvir*—the fruit sellers to a man"; "Trebius for *aedilis*—the barbers"; and so on, right down to the garlic dealers. Even Pompeii's chess club had its favorite son: "Montanus along with the chess players appeal to you: Livius Popidius Ampliatus for *aedilis*." Some of the notices sound suspiciously like the work of a man's opponents, dirty tricks, as it were, Roman style. Thus one candidate got endorsements from the *dormientes universi* (all the sleepyheads), the *seribibi universi* (all the drunken stay-out-lates) and the *furunculi* (sneak thieves). And was it she herself, or some smart-aleck rival, who wrote *Claudium II. vir. animula facit*, roughly translatable as "His sweetie pie is working for Claudius as mayor"?

Yet there was a much more effective and dramatic

Lionel Casson is a professor of classics who writes frequently for SMITHSONIAN. *He most recently examined the ways and means of the early Olympics.*

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way for a Roman politician to enlarge his public image, namely to pick up the costs of some expensive public entertainment. He could, for example, with much fanfare announce that he was paying for the gladiatorial games at a given festival and, if he was out to make a real splash, book for the occasion a line-up of gladiatorial superstars. Or he could take over the cost of the theatrical events. The great satirist Juvenal observed in his sardonic fashion that all that his fellow Romans lived for was "bread and circuses"; such free shows were the circuses. A surefire gesture was to throw a banquet for the voting public, a sort of Roman political clambake.

Gestures like these were expensive. Politics was no more for the poor in ancient Rome than it is in modern America. From the beginning, as a matter of fact, money as a requirement was written into the law. Early on, the Senate was a key organ of Roman government, and from the end of the third century B.C. for the next 150 years it was the principal organ. The Senate consisted of hundreds of members who served for life, and all were required by law to have a sizable fortune. Not unexpectedly, they traditionally came from a circumscribed number of famous old families. For centuries this narrow circle of wealthy aristocrats was the Establishment. Elections simply determined which among them would fill the higher offices and whose sons would get the lower.

For several hundred years before Cicero's time, campaigning for these offices had been carried out more or less in gentlemanly fashion. The rank and file of voters were content to leave things to their betters. It happened that there were also people's assemblies just as authorized as the Senate to pass legislation, but with the Senate running things, and not at all badly at that, most of the popular assemblies fell into disuse.

In 133 B.C. and the years that followed, the situation changed radically. First, reformers broke away from the Establishment. Then, ambitious figures from outside it—*novi homines* (new men, as they were called)—made their way into politics by getting the rank and file behind them. Reformers and new men not only entered the contests for higher office but succeeded in bypassing the Senate by resuscitating the long-dormant people's assemblies and ramming through these the legislation they were after. Early in the game—123 B.C.—they passed a law which gave every voter the right to buy a certain amount of grain at a state-subsidized rock-bottom price. This was the bread of the bread and circuses, not exactly food stamps but the same idea. Like similar items in the federal budget today, it promptly became a sacred cow that few politicians dared tamper with.

The newcomers introduced a new style in speech-making—a way of getting votes even more important then than now in an age that lacked any equivalent of our printed handouts and campaign gimcracks. They gave up the dignified style of the Establishment for slam-bang, fire-eating oratory; the *rostra*, the speaker's dais in the forum, was their soapbox. And then they took the most drastic step of all: they introduced into Roman politics what it had so long been spared—chicanery, bribery and violence. It was easy because in those days the Roman Republic did not yet have a police force or even a standing army. Besides, such armed forces as it did have, recruited temporarily for national emergencies, were barred by law from entering the city.

The time when Rome's political ways truly hit bottom, when the practices of Tammany Hall would almost look good by comparison, consisted of two decades, from 70 to 50 B.C. This is the period reflected in

"Key member of campaign team was the name caller (*nomenclator*), whose job it was to whisper names of approaching citizens to the candidate so that he would be able to greet these potential voters personally."

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JAGUAR
A BLENDING OF ART AND MACHINE

Running for office in ancient Rome

"A surefire gesture was to throw a banquet for the voting public, a sort of Roman political clambake.

Cicero's letter, the period when candidates bought their own election. Not only did they do it indirectly, by buying visibility and subsidizing gaudy public events and hiring squads of retainers, but directly by greasing the greatest number of voters' palms. Not surprisingly, the most powerful politicians of the age were a pair of multimillionaires, Pompey and Crassus. Pompey owned estates so vast that he was able to recruit a private army from the people on his land. Crassus had made a fortune in finance and real estate. Republican Rome not only had no police department but no fire department either. Crassus amassed properties at knockdown prices by cannily taking advantage of this. When a fire broke out he would race to the spot and bargain for purchase from the wretched owner; as soon as the deal was struck, he would send in his gangs of construction workers and start rebuilding. Crassus came to own a huge part of Rome in this way. During his term as consul he paid for a banquet for the entire voting public of the city—it took 10,000 tables to accommodate all the guests—and then topped it off by distributing a three-month allowance of free grain to each of them.

Gestures such as this were only for the likes of Pompey or Crassus. The ordinary candidate depended on direct bribery of individual voters. Bribery, in fact, became so taken for granted that voters regarded it as a right, a sort of annually recurring welfare payment. There was even a word for the agents who took care of passing out the funds, *divisores* (dividers) of the swag. Eventually the buying of elections grew so blatant that something had to be done about it, and various laws were passed whose purpose, like certain campaign laws we have today, was to limit the ways candidates could spend their money. In 67 B.C., for instance, it was made illegal to provide free treats for the voters. The penalty was not only a fine but a deeper threat—anyone found guilty could lose forever the right to run for office. Four years later, when Cicero was consul, he put through an even stiffer measure: during the two years prior to running for office candidates were to refrain from subsidizing gladiatorial shows. In addition, there was to be no hiring of *sectatores*. Cicero's reforms were not entirely disinterested, however. Though comfortably off, he was no multimillionaire, and all the things barred involved expenses that he could not possibly have afforded.

In 54 B.C. yet another election reform was attempted, this one at the instigation of Cato the Younger. Cato was a politician who bucked the trend toward political profligacy: the flag he flew was honesty, decency, integrity. He even dressed the part, going around barefoot, without a toga—the Roman equivalent of shirt sleeves and suspenders. What enabled him to carry it off successfully was incredible courage and indomitable will. Cato was serving as a judge that year, and he convinced the Senate to pass a law requiring all candidates to appear before a sworn court and make public their accounts.

The satirist Juvenal sardonically noted that his fellow Romans lived only for bread and circuses."

This put the voters' noses badly out of joint. They had been counting on the customary annual handouts. When Cato took his seat at court, a crowd entered and raised such a commotion that he had to adjourn the session. He was carried along by the mob to the forum, and there he managed to grab hold of the *rostra* and, partly because of eloquence, partly because of the courageous image he projected, make a speech that succeeded in quieting them down.

Naturally the candidates themselves were in a quandary, afraid of being caught passing bribes—but equally afraid that their competitors might risk it. Finally an agreement was reached to ensure that everyone would stay in line. Each candidate put into a kitty 125,000 drachmas in cash—perhaps about $600,000 in purchasing power today—and anyone caught breaking the law would forfeit his money. The holder of the stakes was Cato, the one man in Rome who could be trusted.

There was yet another important politician active in this age of rough politics, the roughest of them all—Julius Caesar. We tend to think of Caesar as the great general who conquered Gaul, the impassive (and impressive) author of his campaign memoirs, the statesman who managed to "bestride the narrow world like a Colossus." All that came later. For years he was simply Rome's most efficient rabble-rouser, as well as being one of her "beautiful people." Caesar's togas had a longer fringe and a wider purple stripe than anyone else's. He had his barber not only shave him but finish off with tweezers. His hairdresser outdid himself in devising arrangements that would cover up Caesar's nagging bald spot.

He began his career under the worst possible handicap: he had no money. He made up for this in two ways. The first was an unmatched talent for managing mobs. No one was more adept at leading a gang of bully boys down to the Campus Martius, where the elections were held, or to the forum to manhandle the opposition. The second was a genius for getting people to lend him money. This enabled him to spend on political gestures as lavishly as a Pompey or a Crassus. He once gave a gladiatorial show that offered no less than 320 contests. And he was brilliant at public relations. When his first wife died, he conducted a public funeral that had the whole town talking about him.

Caesar's money problems were eventually solved when Crassus, who was trying to hold his own against Pompey on the political scene, decided that Caesar would make a very useful ally. The first step was to pay off Caesar's debts. The sum turned out to be an awesome 830 talents, about $25 million today; there was nothing small-scale about Julius Caesar. Finally, in 60 B.C., Crassus' money bought Caesar the consulship from which he emerged with the command of Rome's armies in Gaul, a command that ultimately put all Rome in his hands.

While Caesar was away in Gaul, Pompey and Crassus were in unofficial charge and they flirted with

"Cato was carried along by the mob to the forum, then made a speech that succeeded in quieting them."

the voters in ways that are astonishingly similar to what takes place today. In 56 B.C., for example, it was perfectly clear that the two were going to go after the consulship. When the question was put to Pompey, however, he replied that "maybe he would run, and then again maybe he wouldn't." And when it was put to Crassus, he replied, "If it is in the best interests of our city, I will seek office; if not, I will desist." Both ran.

The thorn in their side, the one man who gave Pompey, Crassus and Caesar no end of trouble in politicking, was the incorrigible Cato. Once there was a meeting of the people's assembly at which one of Pompey's men, Metellus Nepos, with Caesar's help, had made all the preparations to ram some legislation through, packing the place with the usual roughnecks, plus a seasoning of moonlighting gladiators.

As Cato arrived, followed by a pathetic handful of courageous allies, he had a good look at the opposition—they were stationed around a nearby temple, armed men along the sides and the gladiators on the front steps with Nepos and Caesar at the top. But Cato was unfazed; he was of stern old Roman stuff. The session opened and the clerk began reading the text of the bill. Cato stopped him. Metellus took the document, began reading it himself, and Cato pulled it away from him. Metellus continued from memory, and one of Cato's allies clapped a hand over his mouth. Metellus gave the signal to his gang, they charged and Cato's friends hustled him off in the nick of time to safety in the nearby temple, now emptied of the opposition's men. Metellus started his reading over again, but he had made one fatal slip: thinking he had the situation perfectly in hand, he had dismissed his men—and out the temple door popped Cato to put an end to the bill once and for all.

But the tide of popular opinion was running against him. A few years later there was a session in which Caesar, by now consul, introduced a law to give away land free to the needy. When Cato got up to speak against it—the only one with enough nerve to do so—Caesar simply had his men haul him down from the dais and pack him off to prison, with Cato haranguing the public at large on the inequities of the legislation right up to the gate.

Ten years later, in 49 B.C., Caesar crossed the Rubicon to make himself dictator; five years after that he was assassinated and, when the smoke of the civil wars that ensued died down, Rome was no longer a republic but an empire with Augustus on the throne. Among his first reforms was the creation of a fire department, police department and standing army. No more violence, no more bribery, and by the time his successor took over, no more running for high office.

"Caesar's togas had a longer fringe and a wider purple stripe than anyone else's. No one was more adept at leading a gang of bully boys down to the Campus Martius, where the elections were held."

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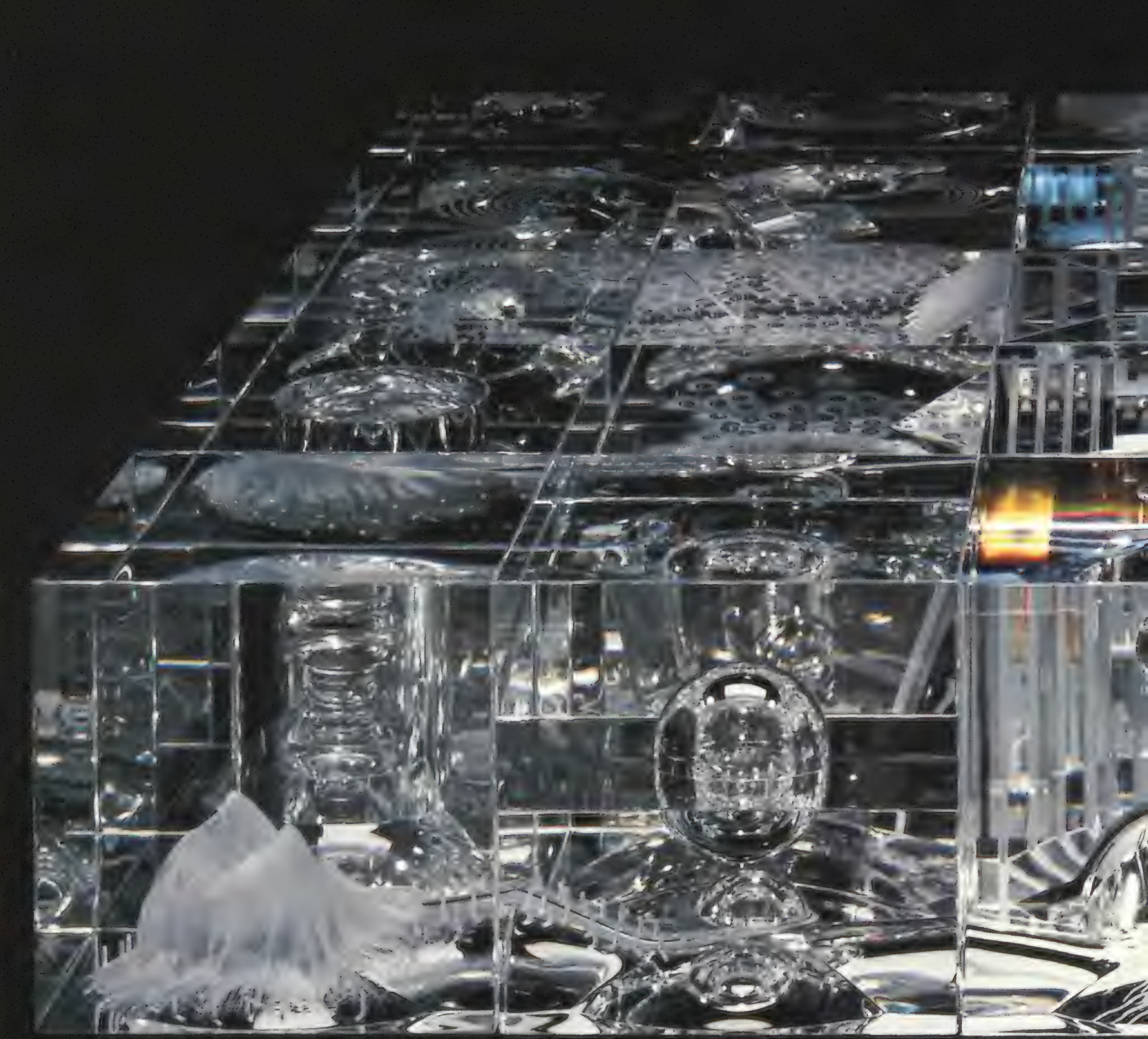


Layer upon layer, vista after vista, *Innerland*'s crystal landscape shimmers with refracted light.

By Michael Olmert

In Steuben show, the art of glass is clear as crystal

In a celebration of 50 years on Fifth Avenue, the fine-art glass firm displays the best of its complex creations with a sparkling exhibit

Eric Hilton designed the piece. It took a master cutter and four engravers four years to complete it.

It's a rough life, designing works of art in glass. Lloyd Atkins has spent many a day with one or another of his fingertips burned and bandaged. He'd be working at the glass furnace with a crew of craftsmen, pointing to a spot on the gather of molten glass where he'd like a crimp or a tuck, and—*sizzle*—he'd invariably get a finger too close.

Peter Aldridge was in the habit of picking up 50-pound blocks of crystal to be machined into his intricate geometrical designs, and in time picked up a hernia. And Paul Schulze was once whacked in the mouth with a gaffer's iron.

This too was during a critical time when a designer, with his plans, and a crew of workers were wrestling with an unforgiving glob of red-hot molten glass. Speed is the key here, because all the while the glass is being worked—gathered, blown, cut, shaped with teflon paddles, compressed into cherrywood molds—it

Donald Pollard did the glass and gold design, Jerry Pfohl designed the engraving, of *The Myth of Adonis.*

Thousand and One Nights, a domed Oriental fantasy, was designed by Zevi Blum and George Thompson.

Crystal bowl, *The Crusaders,* was a wedding gift from President Reagan to Prince Charles and Lady Diana.

Sidney Waugh's *Merry-Go-Round Bowl* was gift from President Truman to Princess Elizabeth.

Centenary of Canada was occasion for *The Great Ring of Canada*, made of crystal and rhodium-plated steel.

A compass rose is theme of Sidney Waugh's *Mariner's Bowl*; made in 1935, it is one of the show's older pieces.

is also stretching, slouching earthward like a mass of new-pulled taffy. And it is all the while cooling as well, which means that it must frequently be returned to the furnace for a burst of new heat.

Each man in the crew has a specific duty at each specific moment, and each knows just where he should be. Elbows and glass irons fill the air. In fact, watching the craftsmen at work is much like watching an industrial ballet. Throw a designer in there, and. . . . In this instance, Schulze was being wary enough of the burning end of the iron; what he neglected was the cold end. He zigged when he should have zagged.

This month Aldridge, Atkins, Schulze and about twoscore other designers and artists working in glass are being amply rewarded for all those pains and scars. Steuben Glass, the venerable institution and landmark at Fifth Avenue and 56th Street in New York City, has mounted an exhibition called "Fifty Years on Fifth," a retrospective showing of its best glass since its doors first opened on the avenue in 1934. About 90 pieces strong, half of them selected by a jury of curatorial experts, the show includes two of the so-called gifts of state for which Steuben is well known. A benefit for the Municipal Art Society inaugurated the exhibition.

The show dazzles, that being what crystal does.

And because the product is exclusively made of crystal glass—a special high-lead mixture of silica and lime that has great powers of reflection and refraction —it appears to be all surface and light rather than some mundane, dense physical material. So the thing to do with glass art is to walk about, to keep moving, to watch as the pieces subtly shift highlights and colors and internal reflections.

The power and grace of this superclear glass was recognized by Arthur A. Houghton jr. in 1933, when he was first given the reins of Steuben, then a withering branch of the Corning Glass Works, the family business. Actually, the company had just developed a new glass that seemed to hold great promise for the optics industry. When it proved too soft for technological applications, however, Houghton was wise enough to see—clearly, it turns out—that this material could make a real contribution to American decorative arts, perhaps it could even raise glass objects to the level of a fine art.

Almost overnight, Steuben became a national tastemaker. Museums and well-heeled collectors began to grab up the company's offerings, and pieces of solid, chunky, otherwise undecorated clear glass came to be the hallmark of a fashionable home. (The proper pronunciation is Stew-BEN, accent on the second sylla-

Michael Olmert writes frequently for SMITHSONIAN, *last on heraldry in the May issue. He is also author of the occasional column,* Points of origin.

ble, after Baron von Steuben of American Revolutionary fame and namesake of Steuben County, New York, the location of Corning Glass Works.)

Englishman Frederick Carder had founded the company in 1903, largely to provide crystal blanks, the prepared raw material, for the Corning glass cutters. But Carder was a great artist in his own right and the company thrived on his vividly colored glass products. In 1918, Steuben became a part of Corning Glass.

But as the Great Depression approached, Steuben fell on very hard times. The legend, subscribed to by many Corning people to this day, is that in 1933, when the switch to clear crystal was announced, Houghton decided to do away with all past stocks of colored glass in one fell swoop. It is said that his henchmen destroyed a whole warehouse full of glasses, lamps, vases, bowls. The image is sharp: two men pass along a series of tables groaning with samples, each holding the end of a long stick between them. When they leave, the floor is a riot of colored shards.

All this, of course, was more a marketing decision than an act of unadulterated barbarism. It was just that the great age of colored glass seemed to have passed, and Steuben had hitched its wagon to the star of colorless purity. And as Houghton himself later recalled, he and his assistants first went through the Carder stock to cull out the artistically and historically important pieces and save them for posterity.

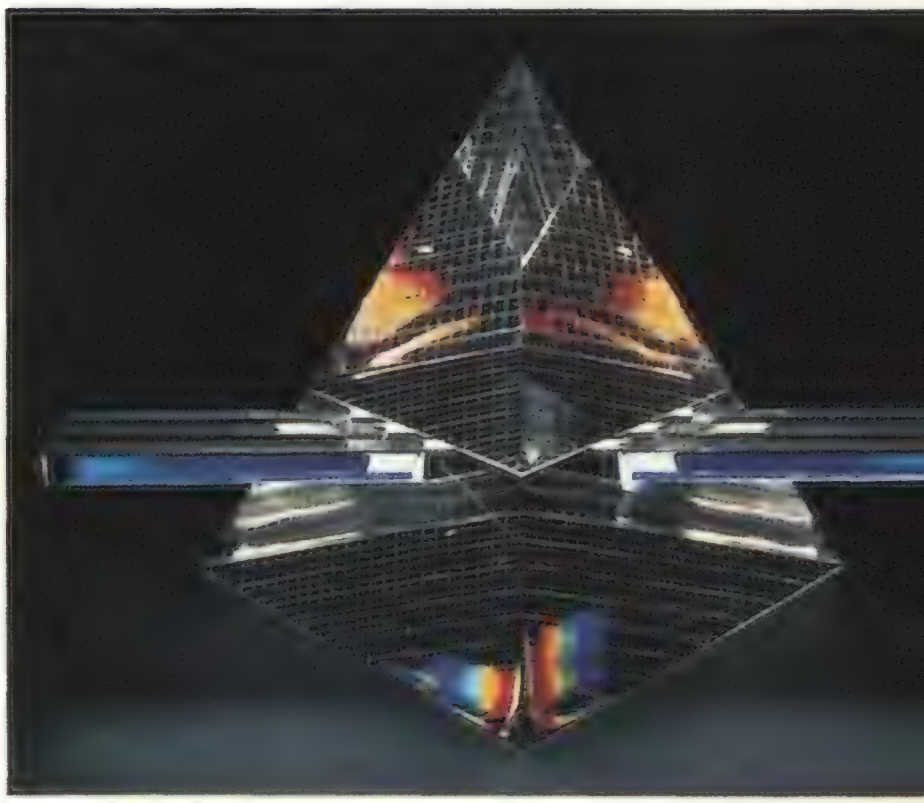
Over the years, the world has come to revere Steuben glasswork almost for its mass alone. Checking out a piece has much in common with going to the supermarket to pick up a few grapefruit. You want to pick up this art, feel its heft, cool to the touch. Indeed, designer Atkins—he of the burned fingers—has developed a line of small pieces called hand coolers, based on the marble and glass eggs that Victorian women took to tea dances to carry away a sudden flush. Atkins' coolers include a frog, an owl, a rabbit, a hen. See one and you want to cradle it in the palm of your hand, rub it against your cheek, look deep inside for its fire, feel its ice. (The coolers are the most moderately priced articles of Steuben's ware, selling in the $100 range. The prices of the monumental pieces like some of those shown here range upward into the hundreds of thousands of dollars.)

Since the administration of President Truman, Steuben has been a font of gifts of state, those elegant tokens of regard given by the U.S. government to foreign dignitaries and nations. Recently, for example, President Reagan gave the great bowl *The Crusaders*, designed by Zevi Blum, to Prince Charles and Lady Diana for their wedding.

Perhaps the greatest of such gifts was a 1967 piece, *The Great Ring of Canada*, designed by Donald Pollard and Alexander Seidel. It includes 12 panels, one for each of Canada's ten provinces and two territories, showing the heraldic device of each one. Inscribed "For the People of Canada on the Centenary of Canada's Nationhood from the People of the United States of America," it was presented by President Johnson to Prime Minister Pearson and exhibited at the Montreal World's Fair in 1967. The whole is surmounted with 12 cut-glass balls, and a large one for the Commonwealth itself. Its crown shows the national coat of arms and the simple motto, *A Mari Usque Ad Mare*, "from sea to sea."

Over 50 years, Steuben glass designers have created a wide array of styles, ranging from the starkest simplicity to incredibly baroque pieces that involve hundreds of hours of cutting, engraving, polishing and the addition of jewels, gold and other precious metals. Donald Pollard's *Crown of Oberon* (1982) is a case in point. Basically, this is a blown crystal dome engraved with scenes from *A Midsummer Night's Dream*.

Somewhat less narrative—and making far more of the prismatic, refractive quality of crystal—is Paul Schulze's *New York, New York*, made for the show. His idea was simplicity itself. Take a 17-inch blank of solid crystal and carve out four corners in the shape of one of the city's four great buildings: Woolworth, Chrysler, Empire State and World Trade Center (p. 147). The



Passage: An Interval of Time is one of a series of abstract, futuristic sculptures made by Peter Aldridge.

Shakespeare-inspired, the one-of-a-kind *Crown of Oberon* was designed by Pollard and Beni Montresor.

completed piece exhibits the optical strengths of glass. Each corner now has two prisms and four reflective surfaces. In fact, there are images of so many buildings bouncing around inside the glass that you sometimes get a glimpse of a building *in* a building—just as you do on the real streets of New York.

"One of the great properties of glass is that when you look through it," Schulze explains, "two-dimensional figures engraved on opposite corners seem to be three-dimensional. They gain volume. So here you see not just the facade of a building, but its whole. Also, I'm amazed at the happy accidents that glassworks create. This completed block itself looks like a building. I had no idea that would happen before I began."

Schulze, director of design at Steuben since 1970, actually straddles the fence between pieces that are purely narrative and those that are rigidly abstract. His reputation was made in 1969 with *Cut Vase*, which is little more than a series of intersecting planes with a hole deftly lodged in the center for flowers. "Why compete with nature?" he asks. "You add the narrative content when you add the flowers."

By contrast, Schulze has also created a nonfunctional, gem-shaped piece that was engraved with the image of dandelions in various stages of growth. The piece is so realistic that you want to blow on it to see if the tiny seeds scatter before your breath.

At the moment, the Steuben designer whose work exhibits the least narrative content is Peter Aldridge, a British glassmaker and teacher who lives in Corning, New York. He represents a new generation of glass artists whose work exploits the abstract qualities of the medium. Typical of his work in general, *Passage: An Interval of Time* (1980) has been carefully machined, to close tolerances, to investigate the links between light, mathematics and transparency (p.145).

"The transparency of the glass seems to be its most critical property," Aldridge says. "It summons up rather more than just the shape of the piece itself." In other words, form is fine, but what the glass does when it internalizes that form is even better.

As if to test the worth of that assertion, Aldridge has also created works in which the glass' transparency has been deliberately obscured. He calls it "deglassing the glass." He explains: take a slab of glass, one you have worked to the shape you want, and heat it in an atmosphere of pure hydrogen. This turns the surface of the glass a deep black, although in fact the black is only a few microns deep. Mind you, if you polish the slab beforehand, it will come out a very shiny black.

The Unicorn and the Maiden, created by Pollard and Alexander Seidel, is a temple of crystal and gold.

If you've left the surface rough, the resulting finish will be matte black. Very nice.

Aldridge's *Passage: A State of Consciousness* (1981) is just such an experiment and includes a two-part base, the lower half of which is a bright black slab. The reflections of the other surfaces on the black perhaps suggest the material from which the whole work was originally wrought—nothing more than a mound of sand, lime and powdered black lead.

But the Steuben designer whose work is currently attracting the most attention, and whose monumental piece *Innerland* is in danger of stealing the show, is Eric Hilton. Like Schulze, his work, too, is a tribute to the way glass surface-engravings seem to float ethereally on thin air and yet are reflected on interior surfaces. Another effect much used by Hilton is the way a semicircle cut in the back of a cube or out of a corner of a prism, for example, will appear to be a great circle or balloon in its reflected version.

There is a kind of multiplier effect in the deep recesses of artwork made of numbers of pieces of glass. It's as if you were still a child in the barber shop, looking into all those mirrors, watching the infinite motion of your own form in the past and future at once.

So it is in *Innerland* (pp.140-141), which is a set of 25 crystal cubes engraved, sandblasted, blown and otherwise decorated with all manner of landscapes—lakes, valleys, mountains, rivers, bridges, clouds, orbs, even an all-seeing eyeball. Each individual cube seems to be a place in a dreamscape, representing a particular time, outlook and set of emotions. Best of all, the contents of each box are reflected and affected by the contents of its neighbors.

In fact, *Innerland* is an elaborate deception. The whole is simply a gathering of images that reflect and grow and disappear, just as things sometimes do in life. Is that hemisphere becoming a planet or just a beachball? And what about those sandblasted clouds: Don't they have human faces? Or are they just cumulus camels like the ones Hamlet saw?

But the point is, you have to move to see it all. And that too makes sense. Glass is never static, whether in the form of a single piece or in its evolution as a medium. It was first created at some ancient hearth at least 3,500 years ago, and continues today to good effect in New York. "Fifty Years on Fifth" celebrates the best of the recent work, and it is good to report that these are full of the same inventiveness and joy, fire and light that flowed from all the great glassmakers of the past.

Paul Schulze's celebratory *New York, New York* reflects glittering forms of Manhattan's skyscrapers.

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More goes into it.

By Charles Elliott

How to read Proust

"Every one is reading Proust . . . .
I'm shivering on the brink"
—Virginia Woolf, January 21, 1922

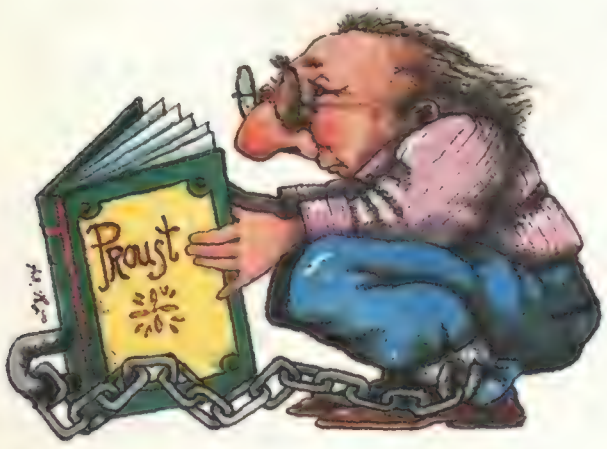
". . . it is our *duty*," wrote Cardinal Newman (who knew something about duty), "to live among books. . . ." As an editor in a publishing house, striving without principle to produce still more of them ("Books? . . . I have more than I can use"—David Hume), I should in decency hesitate to press the point. But Newman is right. Reading is duty, and hard reading is hard duty. "Read we must" observed Lord Shaftesbury; "let writers be ever so indifferent."

The question is, how?

I am, happily, in a position to tell you. In half a century of reading, I've learned a few things about it.

"I am reading Proust"
—Virginia Woolf, April 18(?), 1923

• Do not read in bed. It is impossible to stay awake. Of course some people have fallen into the regrettable habit of reading to *put* themselves to sleep, for which purpose they have special "bed books" of a soothing and soporific nature. It should be recognized that reading and sleep are the two great antithetic activities (see below).



• Do not read *on* a bed. Reading in this fashion, I had by the age of 18 developed a callused elbow and a substantial astigmatism. On the other hand both of my daughters seem to prefer the position to any other. They always read that way. They also manage to compose essays, meditate, bite their nails, listen to the radio and talk on the telephone, sometimes all at once, while leaning on an elbow on their beds.

"Proust, in whom I am embedded"
—Virginia Woolf, April 8, 1925

• Read at a desk. A desk forces you to stay upright in a fairly stiff posture. As a rule the light is good. A hard chair, especially one with arms, is preferable to a chair with padding, although certain desk chairs have benefited from unusual elaboration. Li Yü, a Chinese author of the Ch'ing Dynasty, invented a temperature-controlled stool equipped with a special chamber for cooling one's seat in summer and a chair for warming it in winter. He, of course, customarily sat at a desk.

• Do not read in an easy chair. Like a bed it is conducive to sleep, and has the additional drawback of requiring you to cross your legs and wriggle a good deal in order to prop the book at the correct level. Besides giving you a crick in the neck, this plays hob with the crease in your trousers.

• Read on the subway or in any other form of public transportation where the movement does not make you sick. Sitting facing sideways helps. Dozing off under such circumstances is highly unlikely and concentration much easier than usual. Do not miss your stop. This time is frequently wasted and should not be, as the great English preacher John Wesley knew. "History, poetry, and philosophy I commonly read on horseback, having other employment at other times," he wrote. T. E. Lawrence supposedly read Aristophanes on camelback.

• Set aside specific small chunks of time to be used for reading especially difficult, even repellent, books. For example, do not take *People* magazine into the bathroom with you; take the *Critique of Pure Reason*. I myself read both parts of Goethe's *Faust* (in an excruciatingly bad translation) over the course of several weeks during the time spent removing my tie after dinner each night.

"Proust I should like to finish"
—Virginia Woolf, July 20, 1925

• Read at meals. While this may offend one's spouse and children, and judgment must be exercised, reading at the table has a long and distinguished history. Charles Lamb, as is well known, regarded Milton as suitable supper reading, which he proved by dropping bits of cheese and tobacco ash into the book. It ought to be simple enough to avoid this. A certain delicatessen on Third Avenue is my favorite reading spot above all others, I think. The pea soup (which

The author, who is an editor and vice president at Alfred A. Knopf, reads widely in secondary sources.

is served every Monday) is exquisite and the counter provides adequate elbow room.

"Take up Proust after dinner & put him down"
—Virginia Woolf, June 20, 1928

• Do not attempt to read outdoors. The only exception to this rule is reading when walking, say, to work in the morning. Given a good sense of direction and a bat's ability to evade obstacles without actually looking at them, you should be able to read about three pages a block. I once read six chapters of Balzac's *La Peau de chagrin* before walking into a Madison Avenue bus. It was fortunately stationary at the time. Reading on the beach is not feasible.

• It is better not to read while driving a car or riding a bicycle, though I have known people to do so. I have not checked lately to see whether either of them is still alive.

• Read a variety of books at one time. Some would regard this as less a policy than an apology for mental disorder, but in fact the change of pace is invigorating. Most true readers have six or eight books going simultaneously. This means that it is usually possible to find one of them on the coffee table.

• Do not expect to remember what you read. Few people do, and there is much to be said for slithering through literature like Montaigne, a self-described "man of no retentiveness," who finally took to writing his opinion of a book in the back of it so that he wouldn't make the mistake of trying to read it again as new. With a poor memory one can read *The Thirty-nine Steps* every ten years.

• Wait until you are old enough to read certain books. Only grown-ups should read Dickens, Melville, James and George Eliot. Do not attempt to read Proust before the age of 40.

"I try to read Proust"
—Virginia Woolf, April 27, 1934

• Persist. Especially when reading fiction, the point usually arrives when you will be eager to find out the ending. In certain cases (for example *Finnegans Wake* or *Centennial*) the ending itself may occur first.

• Stay awake. As I have noted, the great enemy of reading is sleeping. I do not know why this should be so; a beekeeper does not worry about falling asleep on the job. Readers, however, must be constantly on their guard. A number of devices, some unsettling, have been employed. Maxine Hong Kingston tells how her father, as a candidate for a civil service examination, first tied his pigtail securely to an overhead hook, then (when drowsiness still overtook him) thrust an awl into his thigh. Petrarch, who must be accounted a failure in this regard, was said to have died with his face in a manuscript.

• Employ special tactics when necessary. For example:

a) *Reading Proust* Select the proper edition, in translation. I recommend the small volumes published in Britain by Chatto & Windus, two of

which make up one of Proust's. They lie flat, the type is pleasantly readable, and they fit into a pocket. Read Proust deliberately and continuously, in regular small doses every day (or every week), preferably under conditions in which no reading matter more attractive than a saltines wrapper is available. Do not give up. Proust gets better in the second volume and by the time you reach Charlus it's whizzo.

b) *Reading diaries and memoirs* Read them at the rate at which they were written. In the case of Pepys, this will take nine years and five months.

c) *Reading philosophy* There is no way to read philosophy. Read *Riddle of the Tsangpo Gorges* instead.

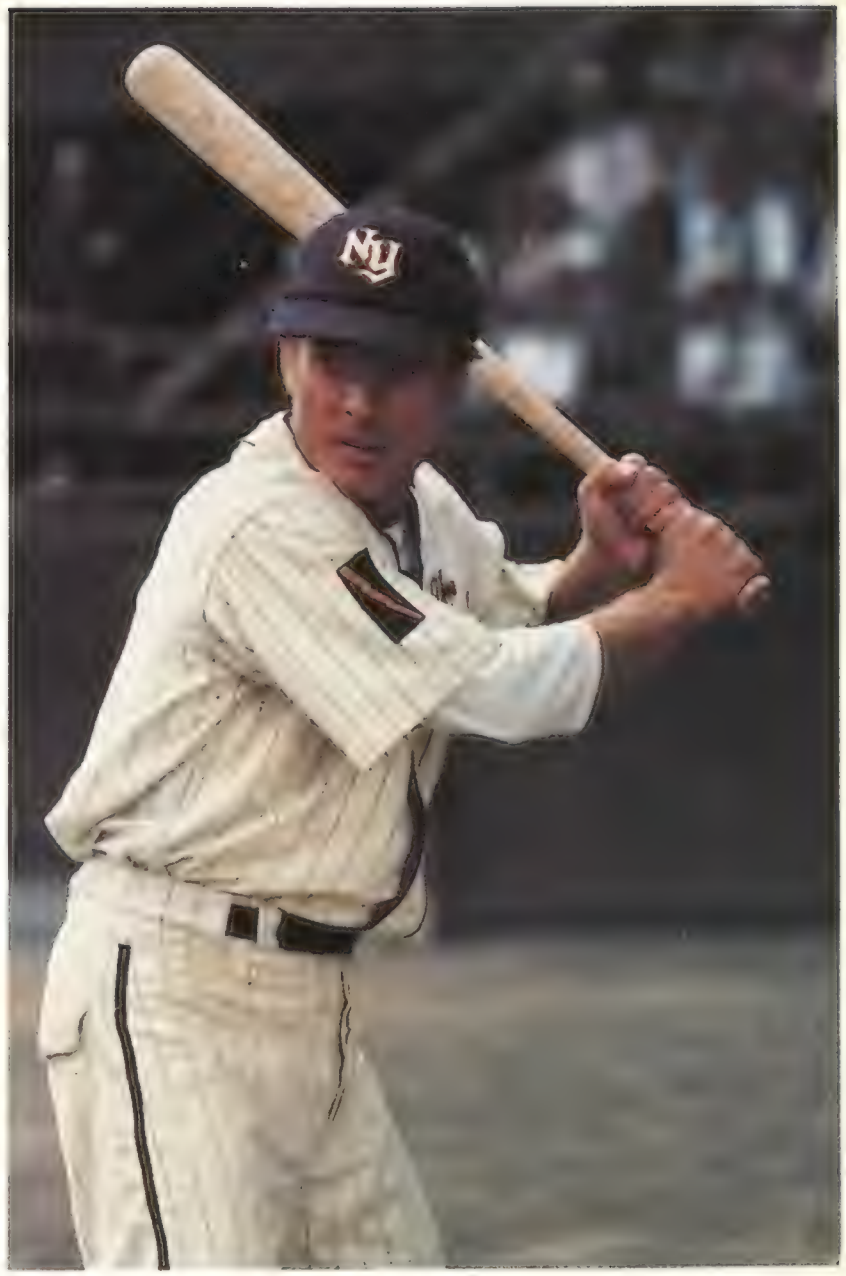
"I followed my new diversion of book binding. I am covering Proust in little shiny squares of gummed paper"
—Virginia Woolf, July 22, 1934

Illustrations by Lane Yerkes

By Phil Patton

Wooden bats still reign supreme at the old ball game

Aluminum is coming on strong, but as we mark the hundredth year of the Louisville Slugger, a simple white-ash stick remains the nation's icon



In film *The Natural,* Robert Redford wields his magic bat named Wonderboy, really a Louisville Slugger.

In Bernard Malamud's novel *The Natural,* the baseball hero makes his own bat from a lightning-split tree. He brands it with a name—Wonderboy—and carries it around in a felt-lined bassoon case. He carefully oils and bones it. He will hit with no other bat. And when Wonderboy finally breaks, he ties its halves together with grave ceremony and buries them in the outfield.

When Hollywood moviemakers needed to replicate Wonderboy for Robert Redford in the film version of *The Natural,* they came to the Hillerich & Bradsby Company, bat makers for a century. Wonderboy on the big screen is a Louisville Slugger.

So it is, to some degree, with all players; each of them creates in his head an ideal bat: an Excalibur, a magic True Bat. And he goes to the people at Hillerich & Bradsby—or Worth, or Adirondack—to have that vision turned into reality. H&B builds its Louisville Slugger to players' specifications, indulging their whims and superstitions, turning each one's ideal shape into a substantial object.

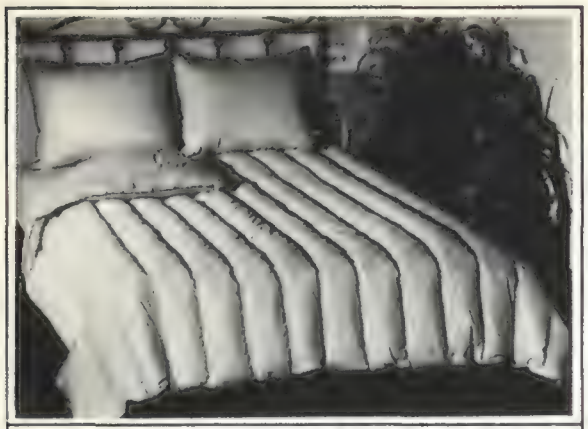
For a player's bat—his stick, his lumber—is not just his weapon and livelihood, but his means of expression and the repository for his personal faith and his doubts. With the right bat he could win games, break records, achieve baseball immortality.

Square to round to semifinished, a barrage of bats awaits final sanding at Hillerich & Bradsby.

This year Hillerich & Bradsby celebrates its hundredth year of ministering to players. It is the centennial of the Louisville Slugger, the bat of bats. In that time, Hillerich & Bradsby has helped turn the baseball bat into an American archetype, a tool in the American grain, a happy union of form and function shaped on the lathe of baseball history.

Consider its shape: as modern and practical as a design by Aalto; as abstract, primitive and timeless as a Brancusi sculpture. It is a shape monumentalized by Claes Oldenburg, designer of giant lipsticks and clothespins, who created a 100-foot-high bat in Chicago. His *Batcolumn* is a steel lattice structure, with a diamond pattern repeating the diagonals of another Chicago landmark—the Hancock building. It is an abstracted bat—shape without substance (p. 166).

"A bat has no up or down, can be horizontal, vertical or whatever," Oldenburg says. He set his bat on its narrow end. This position of implied imbalance gives it a sense of imminent motion, for the bat has no nat-



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Pine-tar fracas: capless George Brett charged the umpire when he ruled Brett's bat illegal and nullified a two-run homer.

ural position of rest; it is at ease only in a batter's hands.

Consider its substance: it is made of northern white ash, *Fraxinus americana*, like the handle of the big broad axe with which a young Lincoln split rails.

At Hillerich & Bradsby's factory, called Slugger Park, is one of the earliest sluggers—a virtually untapered piece of ash with a thick handle.

By the turn of the century, bats began to slim down. When the lively ball turned the game into a contest of home-run hitters, the handle had already shrunk somewhat, the better for the likes of Babe Ruth to take his mighty swing.

The Slugger was created, in H&B's treasured telling of the tale, in 1884 by 18-year-old John Andrew (Bud) Hillerich, who one afternoon saw a local hero of the Louisville Eclipses club break his bat. Pete Browning, the "Old Gladiator" of the American Association, was a fine hitter—career average .343, hit .402 in 1887—but he was in a slump the day he broke his bat. Hillerich was an apprentice to his father, a woodworker who made bedposts and bowling pins. Hillerich spent the night making a new bat for Browning, pausing at the lathe as the star tested the bat along the way.

The next day Browning went three for three and his teammates began to come to Hillerich for similar clubs. After flirting with the name Falls City Slugger, the company trademarked the name Louisville Slugger. The custom-made bat was born. When top salesman Bradsby joined the firm in 1911 and the company created its familiar oval trademark, its hold on the market became almost unshakable.

Today, however, the Slugger may be an endangered species. Unknown to the complacent fan, the day creeps

Phil Patton is the author of Razzle Dazzle: The Curious Marriage Between Television & Professional Football.

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nearer when a major change in the substance of the bat may suddenly be upon us.

A few years ago, H&B was making six million wooden bats a year. Now, with implements of aluminum—aerospace alloy, their boosters call it—infiltrating the amateur market, it makes only a million or so.

Over the past dozen or so years, aluminum bats, which cost more than wooden ones but almost never break, have become the standard at every level of baseball except the professional one. Legalized for college play in 1974, aluminum seems to be relentlessly pressing to take over the professional ranks and a number of observers view its arrival as inevitable. Without it, say advocates of aluminum, professional baseball will become an island of tradition, cut off from the great body of amateurs who are its supporters and reservoir of talent. Studies of the feasibility of using aluminum bats have been made, but the office of the Baseball Commissioner pooh-poohs the idea.

Each year since 1905, when Honus Wagner agreed to allow his signature to appear on an H&B bat, the company has been signing similar con-

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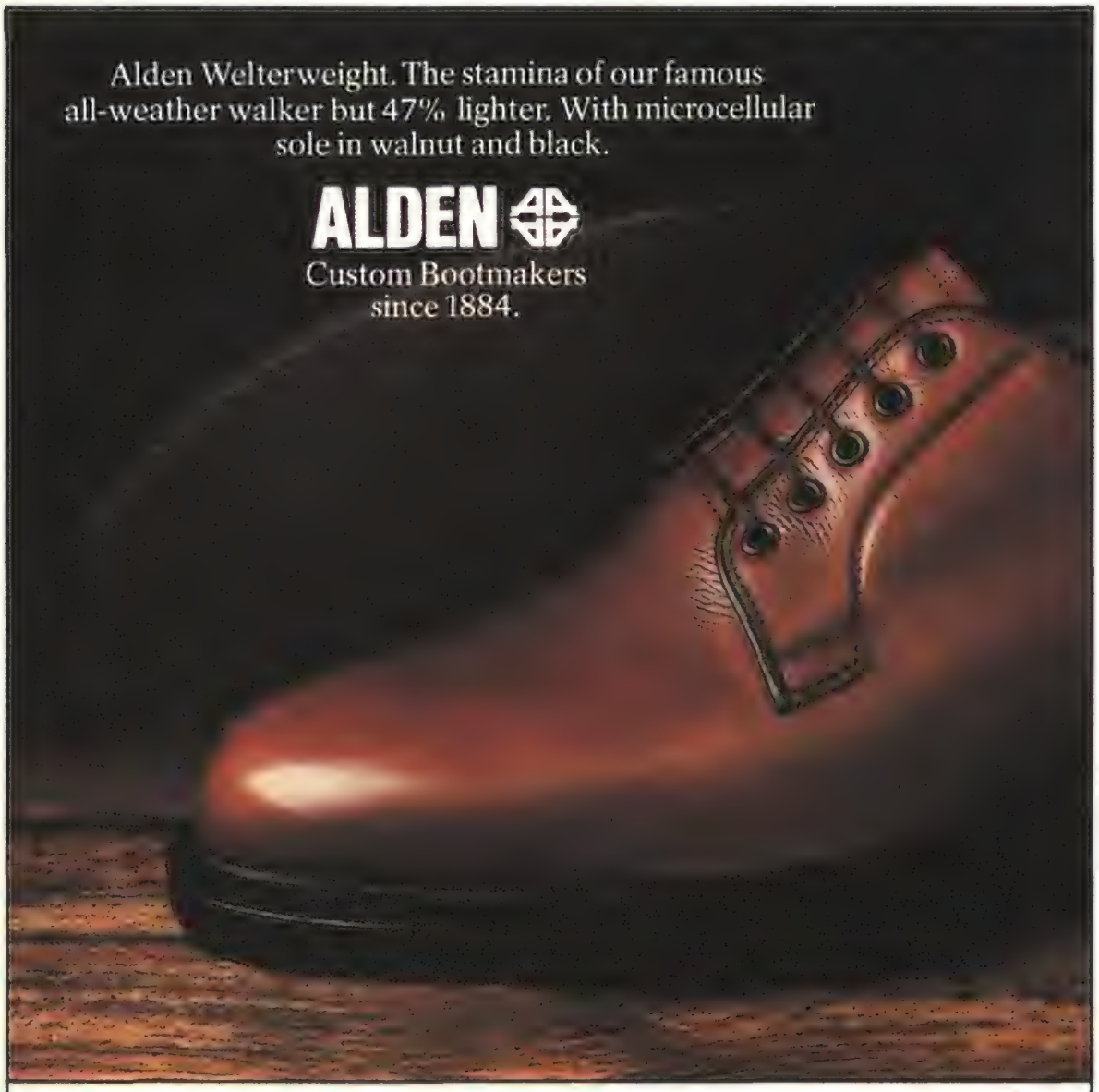

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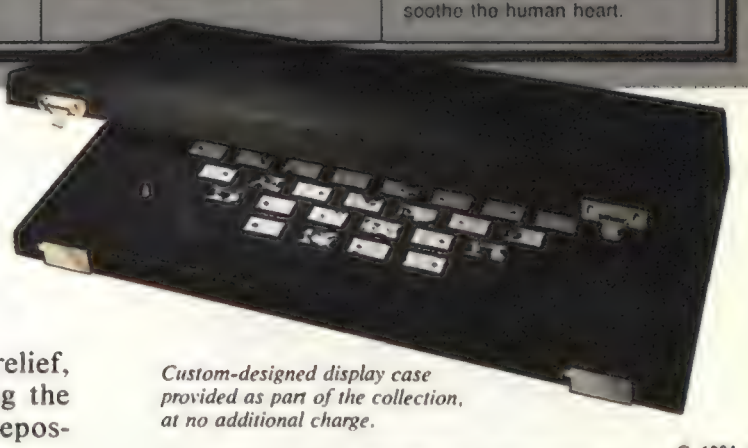

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Yankee Graig Nettles got caught when his bat broke and cork was revealed.

tracts with about 90 percent of major league players. A few years ago, for the first time, it signed up a young rookie only to find that *he had never used a wooden bat.*

No change in the game could be more drastic than the introduction of the aluminum bat. More than the lively ball in use since the Twenties, more than the designated hitter or domed stadium, the aluminum bat would warp the record books and alter the physics of the game. It could endanger the entire mass of baseball tradition.

The aluminum bat helps weak hitters. It is, as bat experts say, "more forgiving." As with all changes in a sport that goes to the heart of America, the bat issue engenders warm reactions. Some observers contend it could produce 500-foot home runs and line drives of terrifying and even lethal speed.

Moreover, aluminum bats are necessarily stamped out in standardized sizes. With aluminum the bat maker cannot "take a little off the handle" or change the knob to suit a player's fancy, as he can with wood.

Aluminum would also change the sound of the game. Gone would be the crack of the bat, the perfect connection of the bat's "sweet spot" with

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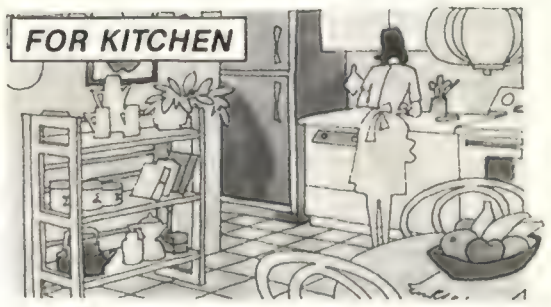

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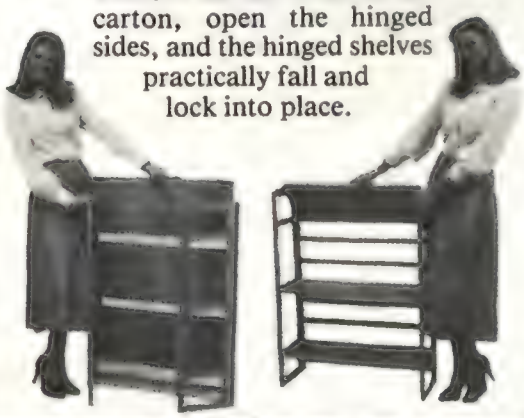

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Ty Cobb, the legendary Georgia Peach, swung a heavy 42 ounces of lumber.

the orb of the ball. The sound of a ball struck by an aluminum bat is different to different ears, but no one could confuse it with the distinctive crack of an ash bat. In the bat business, that is called the ping effect, and although many manufacturers have tried to get rid of it by filling the bat with foamed metal and other substances, none has ever succeeded.

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Wee Willie Keeler—"Hit 'em where they ain't"—used lightest bat in the majors.

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Beyond that—just as we make sure the pants we sell to women are made to fit a woman, not a man—we have specified certain design changes that improve the look of children's garments on children's bodies.

These are subtle changes. Like narrower stripes in a Rugby shirt, or possibly a proportionately longer sleeve. The shirt still looks like Dad's and is of the same quality, but it almost custom fits the child.

No standing ovations, please.

We don't mention these things to invite your applause. They're simply "part of the territory" Lands' End has carved out for itself, in providing *quality* first, then *price*, and always, always *service*. We leave no room for compromise. And even though this kind of attitude takes us to the ends of the earth to bring you our best, so be it. What are principles for if you don't act on them?

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drawing by Cass Anderson, age 7

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Cincinnati's Heinie Groh whittled his bat until it looked like a milk bottle.

of the wood and to the tradition of the game. "He got good wood on that one," the fan will say, or "You don't even have to watch that one to know it's out of here."

Nowhere is that tradition more zealously husbanded than in the museum and model room at H&B—the high holy of batdom. In the museum are displayed priceless relics like a cracked Slugger bearing 21 notches cut around its trademark—the bat Babe Ruth used to hit 21 of his 60 home runs in 1927.

There is a whole wall full of stills from the baseball movies to which H&B has been adviser: *Pride of the Yankees, The Babe Ruth Story* and *It Happens Every Spring*. One photograph from *The Winning Team* misidentifies the young actor who played Grover Cleveland Alexander as "Donald Regan," an error that would elicit chuckles in the Department of the Treasury as well as in the White House.

In the master model room, the im-

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ages on the wall are different: old color lithographs of stars long since gone to Cooperstown, preserved in their prime, their Sluggers resting on their shoulders beneath the happy blue summer skies of seasons long since entered in the record books.

About 20,000 individual bat specifications are registered here. Once kept on note cards, they now reside on microfiche. The sawdust that thinly covers almost everything at Slugger Park has drifted in to coat the 300 or so bats kept on display.

The bats in the model room bear numbers and letters burned into the end of their knobs—a model code. M110, for instance, indicates the most popular bat, the Eddie Malone. The code indicates that Malone was the 110th player whose name started with "M" for whom H&B made a bat.

The model bats of all the great players—each slightly different, all essentially the same—rest on their sides like treasured bottles in a wine cellar. Feel the knurled grip of a bat from the Victorian era. Heft Stan Musial's model, with its slender handle. Chuckle at Heinie Groh's magnumlike bottle bat. Lift the stout club of Ty Cobb's wondrous weapon.

In 1941, Ted Williams gave his Slugger a big smooch after his .406 season.

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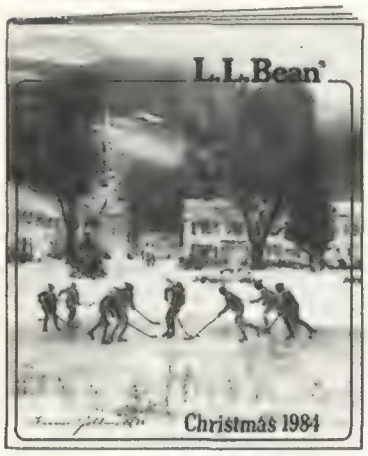

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Multiflash photograph freezes the sequence—before, during and after—of the bat meeting the ball. Images were taken at a rate of 120 per second.

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They are Louisville Sluggers all.

The white ash for bat making prepares itself for its task with a half century or more of growth in the forests of Pennsylvania and upstate New York. Trees that sprung up when Ruth was in his prime are made into bats for current young stars.

H&B alone needs about 200,000 ash trees a year and owns thousands of acres from which to cut them. (It also replants the acreage.) For every ten billets the bat makers cut, only one is good enough for a professional bat. The best ash grows on ridgetops, on the northern and eastern sides of the hill, for slower, harder growth. The best log is the butt piece, the lowest on the trunk. The heavier wood that the professionals need comes from trees 12 to 14 inches wide, and about 60 to 75 years old. But the wood must not be too old.

From the quiet green slumber of northern forests, the wood rides trucks or trains to Kentucky or Tennessee or New York State. Along with H&B, the major wooden-bat makers are Worth, of Tullahoma, Tennessee, and Adirondack, part of Rawlings, whose bat factory is in Dolgeville, New York.

Adirondack bats, easily identified by the trademarked Pro Ring around their girth, are favored by a number of heavy hitters of the major leagues: Mike Schmidt of the Phillies, Greg Luzinski of the White Sox.

Worth's contributions to the wood bat—besides the wonderful brand name, Tennessee Thumper—are its supposedly scientific concept of "swing weight," a formula for determining the best bat shape and size for each player, and a laser timing device used to determine that formula they call the Swing Ray.

Hillerich & Bradsby's Slugger Park is in Indiana now, in Jeffersonville, just across the Ohio River from Louisville, where the corporate headquarters remains. On the outside, it looks like any other modern factory. On the inside, the mood is 19th-cen-

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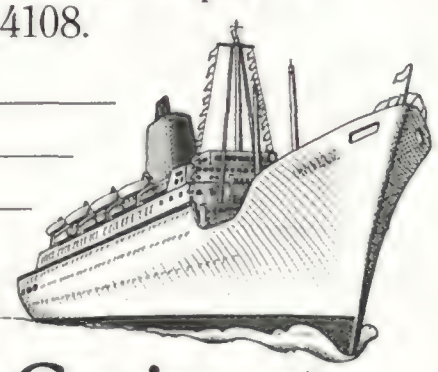

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tury, full of ancient wooden carts with thick wheels like old-time locomotives to move the bats about.

The wood, cut into short dowels or billets, cures outside for six months or so. The billets are rough-shaped before being designated either for professional bats or cheaper models.

Commercial bats are made by automatic lathes, each equipped with 28 knives that are individually set for the type of bat. This process takes a couple of hours, but once the machine is configured properly, it can turn out a bat every eight seconds.

The professional bats are made on a hand lathe, with a model in front of the maker—for shape—and a small scale with which to constantly keep track of the bat's weight—for substance. At the lathes, H&B craftsmen like Arthur Coyle jr. use tools virtually identical with those young Hillerich employed to make professional bats. Coyle keeps picking up and putting down a set of calipers, comparing the embryonic bat with the model at each of 15 critical diameters.

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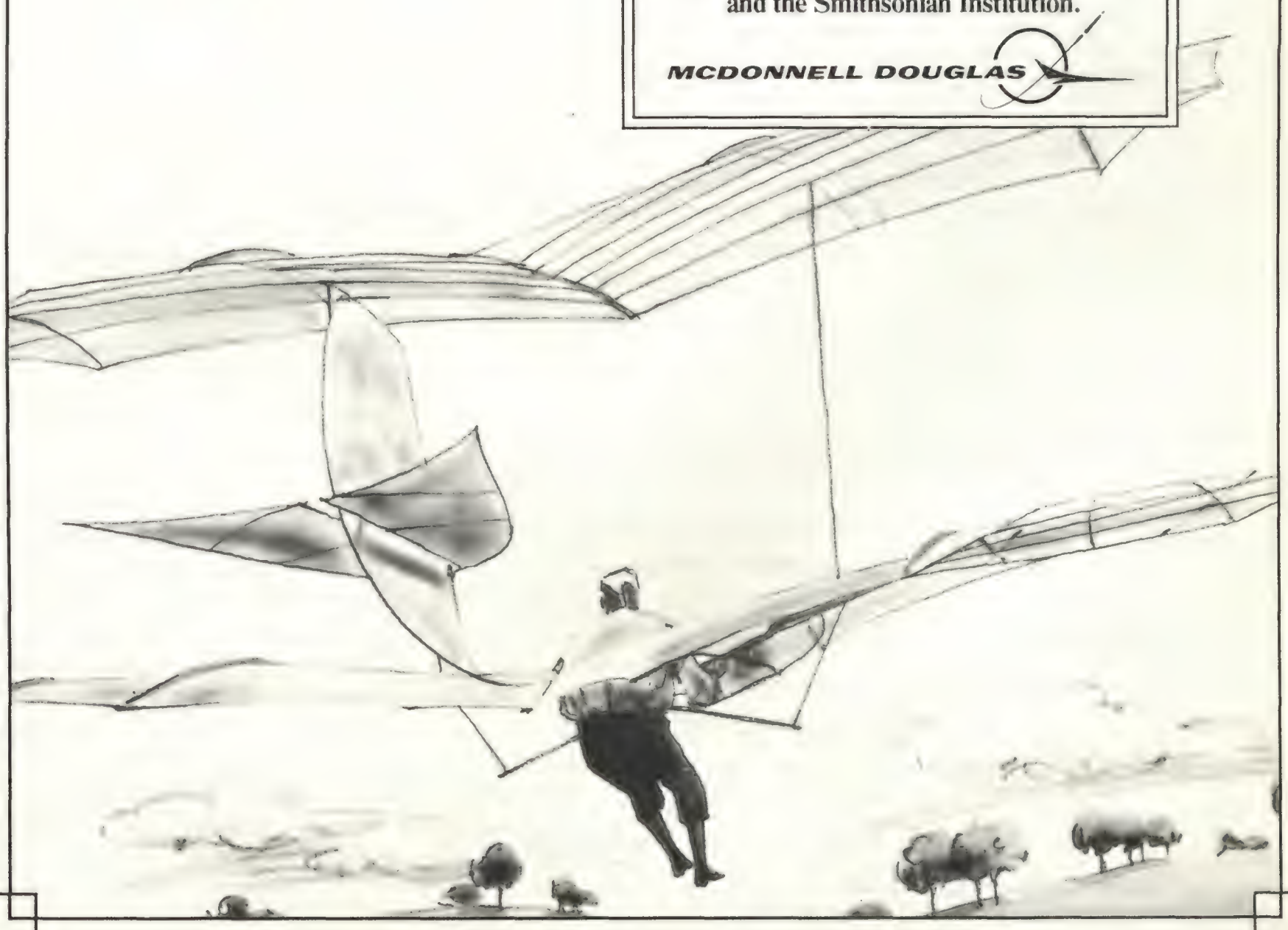

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Curling shreds of wood spray up and settle on his beard and arms and jeans. Each bat takes perhaps 20 minutes to make.

Worked on the lathe, shaped seemingly with the mere touch of an old tool, the billet seems soft, blurred by its spinning speed, almost liquid. Only when it is removed from the machine does it solidify again, grain visible; a familiar object is born.

The bats are sanded, finished with a brisk roasting over a range of gas flames to bring out their grain, branded with a trademark and autograph and then dipped in finish.

Bat makers follow the fate of their products, sometimes going to the games to watch their wares in action. Coyle turns on the television set to see how his bats do. Brian Scarlett of Worth drives from Tullahoma to Atlanta to watch his bats in the hands of players like Bruce Benedict and Bob Horner. Theirs is a privileged kind of fandom.

A pro may use as many as six dozen bats a season. Orlando Cepeda changed bats virtually every game and used up 12 dozen a year. But the Hall of Famer Joe Sewell used just one bat in his 14-year career and teased the folks in Louisville about

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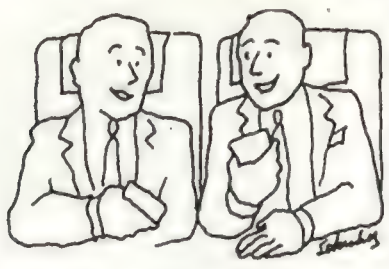

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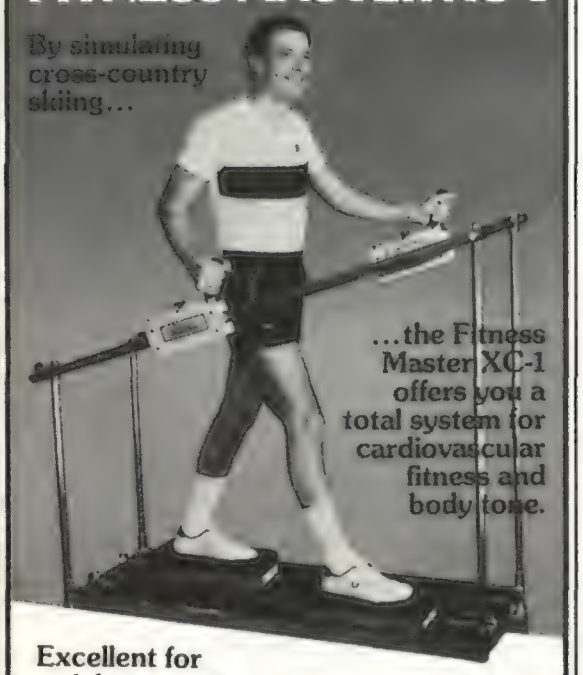
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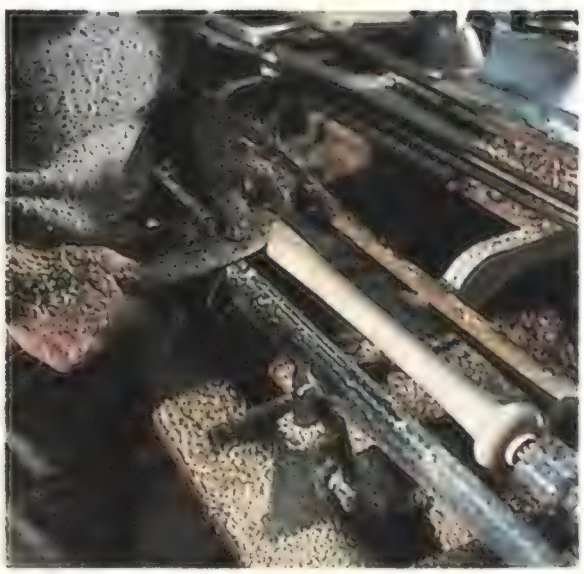
how much money he was keeping out of their pockets. The teams pay for the bats—they cost about $10 each, and H&B actually makes very little profit on its professional operations.

There are plain bare bats, shellacked bats, brown and black bats. H&B offers seven different finishes to its bats. There is the Walker finish, a two-toned brown-and-natural bat that takes its name from Harry (The Hat) Walker, who came to the Louisville plant and found the only bat whose heft he liked being used to stir a vat of brown varnish. One of the most recent additions to the palette is the "Foster finish," the black stain of George Foster's famous Black Beauty bats, introduced in the Seventies.

Often, the finish covers only the striking end of the bat. The handle is left bare, open, porous, ready to absorb sweat and tar like a second infusion of sap, and to be grafted—hand, arm, trunk—to the player.

The use of pine tar to improve the grip has become more and more popular over the past few decades, as batting gloves have replaced the calluses of the past. Last year's famous pine-tar incident, in which George Brett hit a controversial home run with a bat treated with extralegal pine tar—18 inches up the handle is the limit—turned into the biggest bat story in years. The objection is not to pine tar as such, but to the addition of any



Craftsman hand-shapes a bat for pro player, keeping model well in sight.

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to please him, the despairing bat makers repacked order number one and sent it out again. "These are fine," Simmons responded. "Why couldn't you have made them like this in the first place?"

Tales of "corking" or otherwise doctoring bats are rooted deep in bat lore. Early bat men used to put nails or lead in their bats to harden them; one minor leaguer—according to the Padres' Graig Nettles—reportedly managed to hide a tube of mercury inside his bat; its shifting weight gave him extra clout. The only penalty for using an illegal bat is the player being called out.

When he was with the Yankees, Nettles was once caught in the act of doctoring a bat. In 1974, he broke a bat hitting a single. The head of the bat flew off revealing a cork-plugged barrel—and it drove the crowd wild. "I was out anyway," said the philosophic Nettles.

Earl Weaver, the great Baltimore Orioles manager, was no more than an average player in his minor-league days and he could use all the help a corked bat could provide. He explained in his autobiography in great

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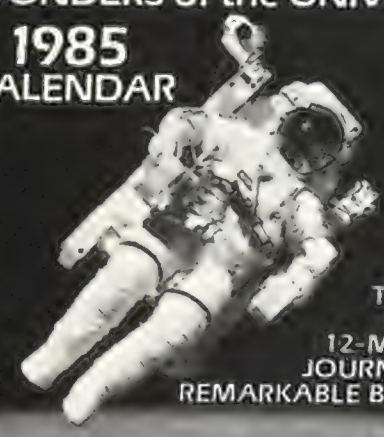

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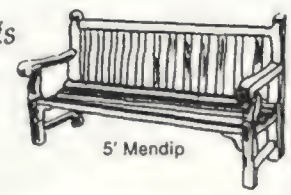

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detail how the doctoring was done:

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Corking makes a bat lighter so that it's easier to swing. The physics of hitting, like the science of doing it successfully, takes place at a level mostly beyond the conscious eye. The ball, approaching at approximately 130 feet per second, takes less than half a second to go from pitcher's hand to home plate; the batter has less than one-quarter second to decide to swing. In a collision imparting a force exceeding half a ton, the bat redirects the 80 or 90 mile velocity of the pitch into 60 or 70 of outward velocity. In the process, the ball is compressed to perhaps three-quarters of its width before recovering its shape, and heat is released.

Every batter has a plate persona—his stance, his practice swings, his glare—and his bat is a key part of that identity. George Foster cultivates mutton-chop sideburns. His eyes are set deep in snakelike slits, and before the pitch his bat writhes back and forth ominously like a rattler before its strike. "Bats," Foster flatly declares, "are reptiles."

In 1977 Foster hit 52 home runs, a tie with Willie Mays for the third highest total in National League history. Last year he did not do that well, hitting only .241 but with 28 homers.

Then, during practice this spring, Foster borrowed a bat from Keith Hernandez. It was a blond Slugger with a "teacup" end—a scooped-out top that lightens the bat by an ounce or so—weighing just half an ounce less than Foster's Black Beauty. "George is 35 now," says Hernandez. "It's not like he's a young man any more. He needs a lighter bat."

The night Foster borrowed that bat, he hit a single, two doubles and a home run. Before long, he was back in his old form, leading the Mets in runs batted in.

He was also living out again one of the classic motifs of batdom. Mickey Mantle did it, borrowing some rookie's lumber to hit a 565-foot home run in Washington, D.C. Joe DiMaggio did it to keep his streak alive in 1941. And the makers of the film version of *The Natural* have changed the ending of Malamud's book so that after breaking Wonderboy, the hero borrows a bat from the bat boy to hit his final, triumphant homer.

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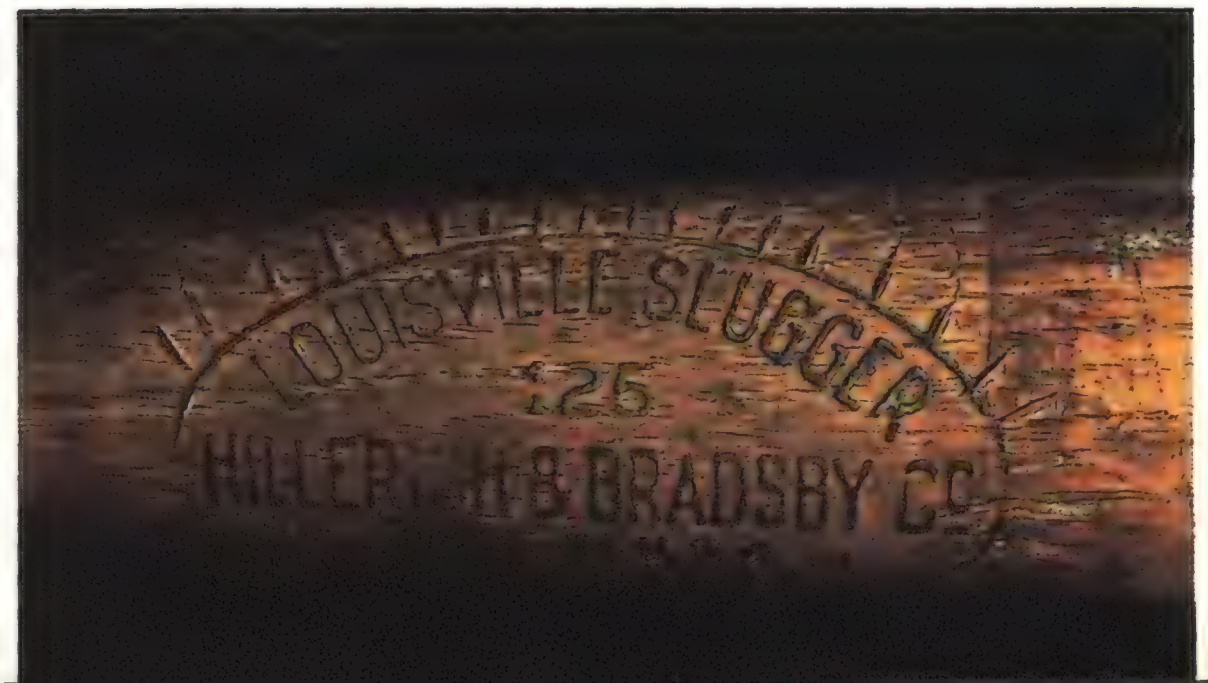

Nita Franks had no insurance, no savings and a very sick child.

On May 31, 1983, Nita Franks, a part-time pecan sorter in Corsicana, Texas, carried her extremely weak son into the emergency room of Navarro Regional Hospital, one of over 400 hospitals owned or managed by Hospital Corporation of America and its affiliates.

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"It's hard knowing your child needs help and you can't afford it. I'll be eligible for insurance soon, so I don't expect to always need help like this, but it was sure nice to know it was there when my little boy needed it.

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Nita Franks and her son Courtney, Corsicana, Texas.

Points of origin

From den of iniquity to the church altar, games of chance and skill have found their place in every age

There I was, dining in a pub called the Green Man and French Horn, in St. Martin's Lane, London, awaiting the start of Mozart's *Così fan tutte* nearby. The opera is based on the story of a Neapolitan wager involving romance and fidelity. I thought of this as my eye chanced on a discreet wall plaque across from my seat. Under the title "Betting, Gaming & Lotteries Act of 1963," it warned: "With the permission of the manager only cribbage, dominoes and certain games *of pure skill* may be played for small stakes."

Far from being merely a sign of the times, this seemed to be a notice that compressed most of the history of wagering into 21 words—especially the notions of controlling the stakes, prescribing the games to be bet on and hammering home the distinction between games of skill and games of chance.

Certainly people have been betting on the outcome of a vast range of activities for ages. An early account in the Old Testament tells of the wager of Samson. A foreigner and an Israelite, he was about

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The Card Players depicts a group of middle-class burghers in Flanders, about 1530, consulting each other on how to play their hands. The game, like the artist, is unknown.

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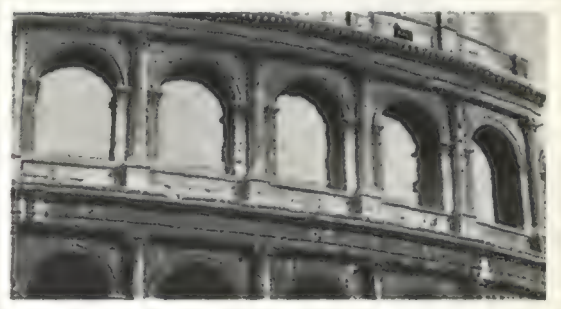

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to marry a Philistine woman; to prove himself he bet 30 of the wedding guests that he could outriddle them. The stakes: 30 linen tunics and 30 festal garments. The riddle: "Out of the eater came forth meat, and out of the strong came forth sweetness," which had to be solved before the seven-day marriage feast was over. Samson had proposed that particular riddle because he had slain a lion on the way to the wedding. Later, the carcass was transformed by a swarm of bees which had filled it with honey.

During the next few days Samson's bride tried to extract the answer from her husband, and when Samson finally relented and told her everything, she betrayed him to her compatriots. Samson's response was to go to Ashkelon and kill 30 men, whose garments he then handed over to the Philistines.

Although this wager was associated with betrayal, bloodshed and loss, the means employed—riddling and betting—were often looked upon with favor by rabbis in the Middle Ages, perhaps because such gambling enabled Samson to overcome the enemies of his people.

In the long parade from ancient to modern times, a distinction between games of chance and skill has been drawn. The Romans, under the Code of Justinian, forbade games of chance and tolerated those of skill, as long as the stakes involved were not excessive. They undoubtedly reasoned that chance introduced too much margin for cheating. Loaded dice and weighted coins are commonplace in classical and medieval archaeology, as are marked cards among Renaissance artifacts. Obviously, that same sentiment lies behind the plaque in the London pub.

By contrast, in the United States, the bias at our gambling resorts is against games of skill and toward chance. Take the celebrated case of blackjack players who count cards and memorize odds to defeat the casinos. The resorts maintain files on such players and try to ban them from their tables. A spokesman for an Atlantic City gaming house recently noted that such people abuse what should be a game of chance by turning it into a game of skill.

On the other hand, state legislators in California have acted against chance in favor of skill. All forms of poker consid-

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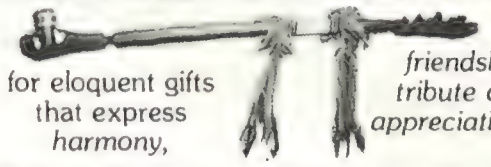

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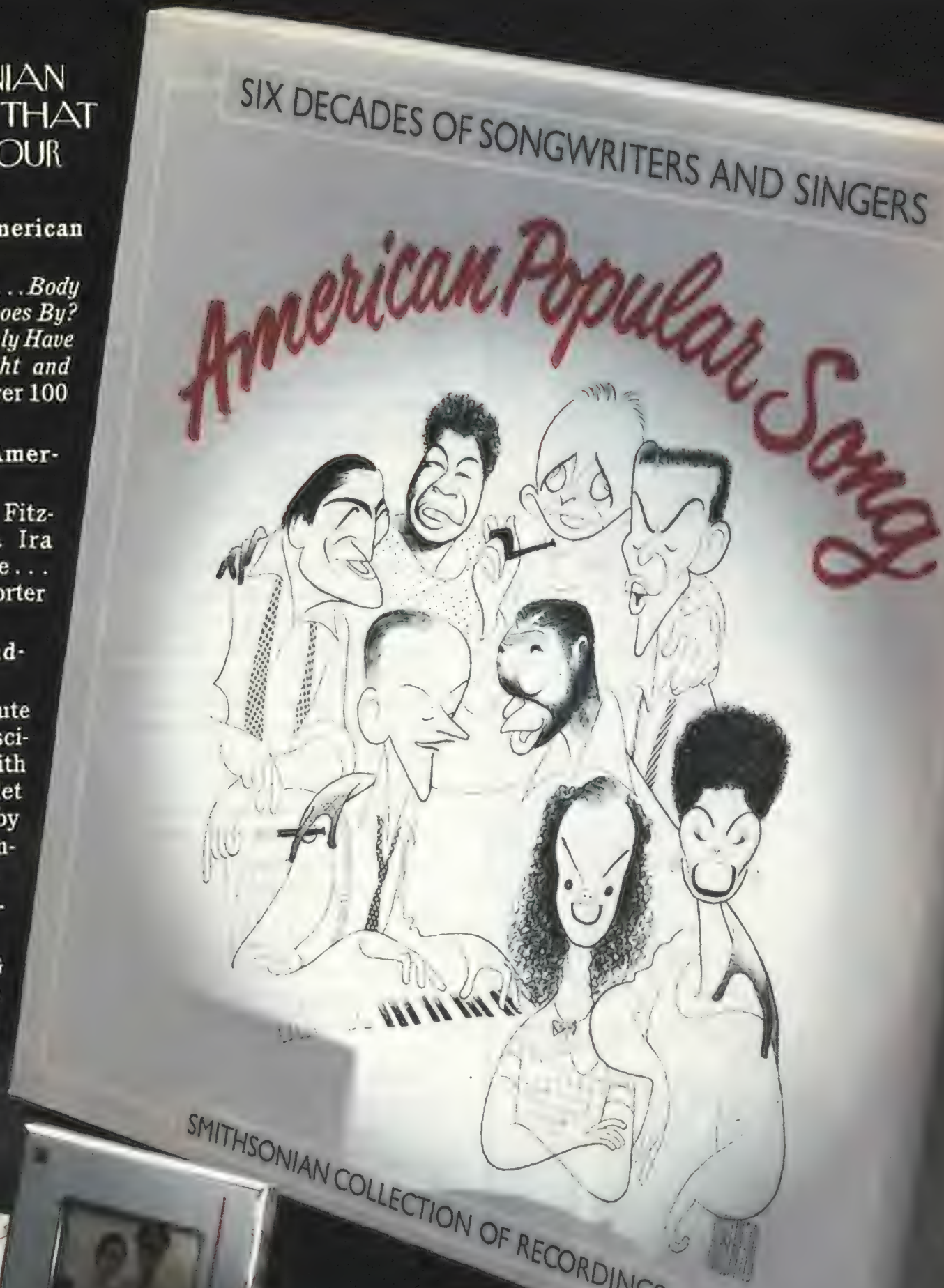

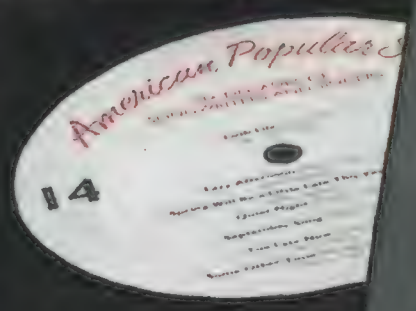

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ered variants of "draw" are legal, while "stud" poker continues to be illegal. The ingenious idea, established more than 100 years ago under state gambling legislation, was that draw was a game of skill.

History is replete with attempts to ban gambling of both kinds. The medieval Church often tried to curb betting not because it was an outright sin, but because it inclined men to sloth, encouraged them to play rather than pray and led them to haunt taverns.

In some eras, the arguments against betting have been matched by reasons for approving of it. The respected physician and mathematician Gerolamo Cardano (1501-1576), who wrote a treatise on "games of chance," saw gambling as a fit test of patience "for a good man will refrain from anger even at the moment of rising from the game in defeat." Because of his interest in games, Cardano was able to pioneer the science of probability. He even had a few kind words for card players: "Those . . . who know merely by close attention what cards they are to expect are not usually called cheats, but are reckoned to be prudent men."

The Church has its own history of gaming. All Saints Parish Church of St. Ives, Cambridgeshire, England, holds an annual dicing on the altar. The stakes, six Bibles, are awarded to the best of 12 child dicers in a game that began in 1678 and continues right up to the present time.

Civil and religious authorities have traditionally worried about the poverty that attended ill-fated bettors. Roman laws had tried to stop the lower orders from gaming while turning a blind eye to patrician betting. In the face of terrible Roman poverty, the poet Juvenal satirized the gaming habits of the rich: "What can we think of these profligates more ready to lose 100,000 than to give a tunic to a slave dying with cold?"

It was much the same in England. At Coventry in 1553, dicing was forbidden to laborers, journeymen and apprentices. While Cardinal Wolsey was attempting to have all the cards, dice and bowling pins of the common people burned, there is a record of Henry VIII losing £9 at "shovel-board."

The penchant for gambling has survived all efforts to ban it, and people have managed to wager on a mind-numbing range of events. Among my favorites: the Victorian gentleman who stood on

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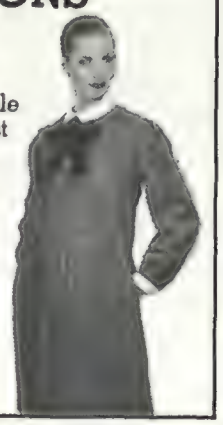

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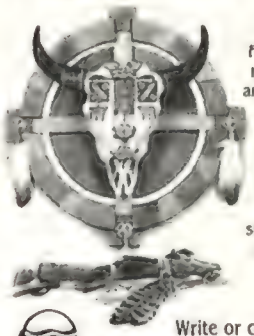

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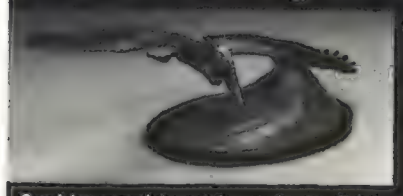

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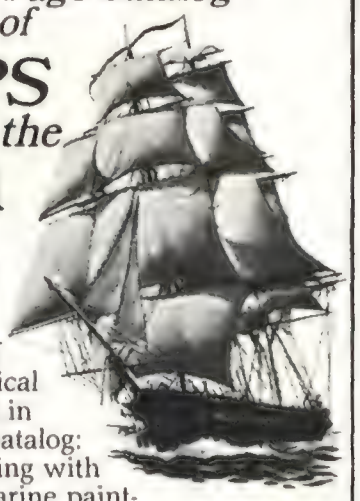

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The judge, admitting that wagers were not illegal, agreed to hear the case. In the end, the Chevalier was declared to be a woman, the plaintiff was awarded £700, 40 shillings, while immense sums were said to have been involved for other bettors. The judge would have preferred a different outcome: he wished publicly that he had the power to make both sides lose.

Michael Olmert

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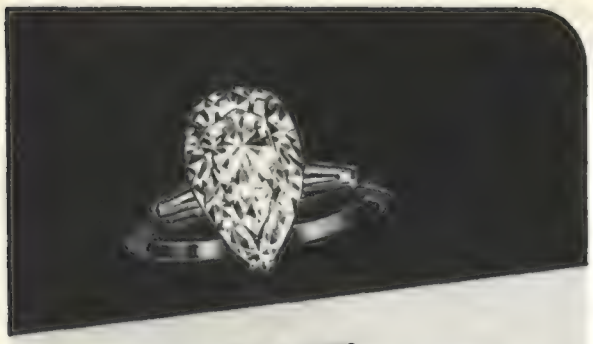

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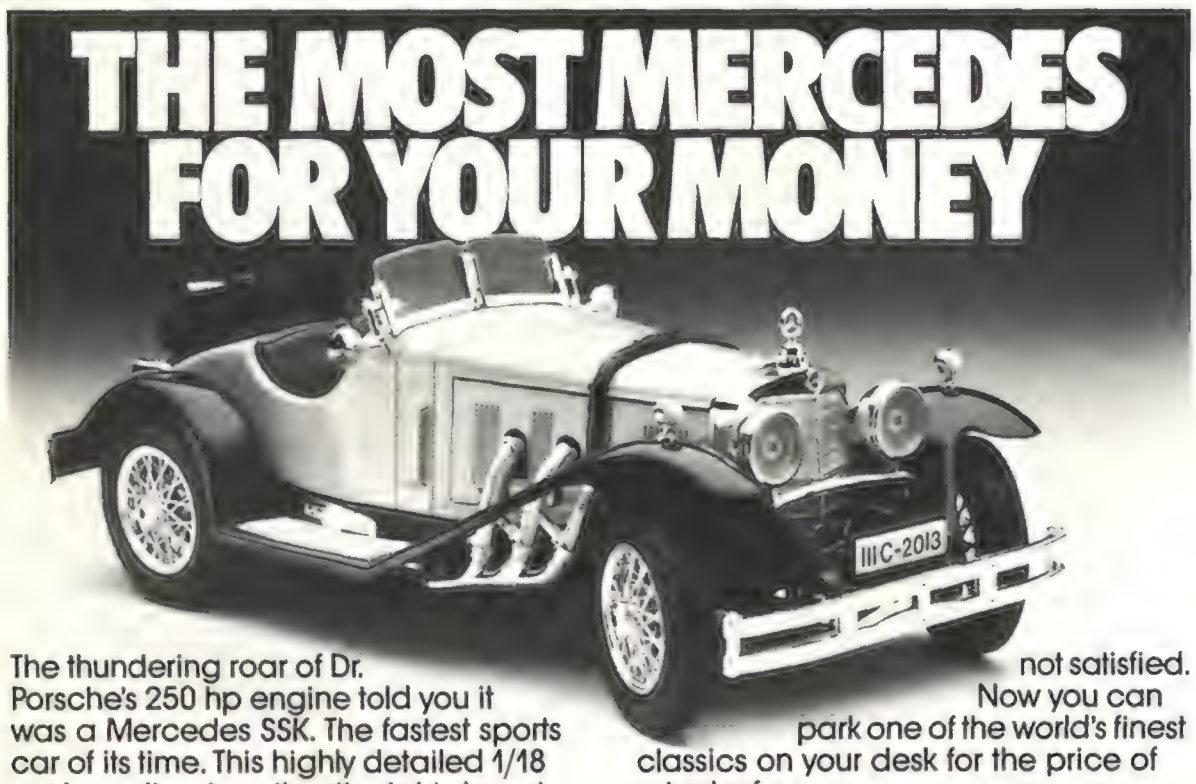

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Book reviews

Son of the Morning Star:
Custer and the Little Bighorn
Evan S. Connell
North Point Press, $20

They went down like sheep, said Chief Rain in the Face. He was referring to the Seventh Cavalry at the Battle of Little Bighorn, and he knew because he was there. The unit's leader, Lt. Col. George Armstrong Custer, owned a deserved reputation for daredeviltry, but on June 25, 1876, he and his men died like stampeding stock.

The marriage of the Last Stand material and that superior storyteller, Evan S. Connell, is one of the happiest in the

Leonard Baskin's drawing of Custer shows him in pensive mood, tinged with defeat.

recent literature of fact. Connell has done this sort of thing before in miniature—notably the 18 historical essays collected in *A Long Desire* and *The White Lantern.* His new, full-bodied book has been four years in the making, and the result is vivid and enthralling.

As one would expect of a first-rate novelist (*Mrs. Bridge,* his 1959 exploration of the Midwestern mind, is a coterie classic), Connell has a raptor's eye for what he calls "the luminous detail." He tells us why Custer usually wore a spread-eagling hat: his redhead's skin was so fair that he had to protect himself from the sun. For a time Calamity Jane "trailed [Custer's] regiment, dressed in male clothing, covered with lice. . . . The men avoided her, now and then giving her whiskey in exchange for doing their laundry." Then there is the tall but true tale of Mrs. Nash, the mysterious, veiled camp follower whose husbands tended to desert. A postmortem proved her to be a drag queen.

Connell is also the perpetrator of marvelous asides—breaks from the mainstream of doom-trending action in which he discourses on such aspects of life on the Great Plains as Indian names, techniques of scalping and how to keep a straight course on horseback without compass (have a steady-handed archer shoot an arrow ahead and follow it).

As for the debacle itself, Connell deftly assembles the tragic elements: Custer's headstrong temperament, which spawned the repeated—and finally fatal—error of attacking without first reconnoitering; the grandiose fantasies that prompted him to seek a famous victory so as to be lionized all the way to the White House; his inaccurate assessment of the Indians' numbers.

The last bears some explaining. Custer and company were led to believe that most Indians in the area were still on their reservations, whereas in fact thousands had fled from them, rallying to the leadership of Sitting Bull, Crazy Horse and Gall. The discrepancy stems largely from avarice conjoined with a self-defeating system. U.S. Indian agents "profited according to the number of Indians on the reservation. Which is to say, an agent foolish enough to report a decrease in population was taking a bite out of his own paycheck." The upshot was a gross underestimation of the strength of Custer's foes. In the words of Maj. Marcus Reno, who aborted the auxiliary attack he was assigned to lead in support of Custer's, "I think we were fighting all the Sioux nation. . . ."

The only shortcoming in *Son of the Morning Star* is one inherent in the subject—and in human nature itself: the record is so riddled with disparate versions of what happened, that time after time Connell must pause and try to sort them out, only to conclude that we really don't know whom to believe. At one point he comments on this progressive muddying of the waters. Considering a 1908 on-site investigation of the battle, he writes: "instead of resolving a small mystery [the effort] has contributed to it, which often happens to Little Bighorn detectives." Yet thanks to Connell's dogged research and vibrant style, we can now master the fundamentals of what happened at the Little Bighorn more fully than ever before.

Dennis Drabelle
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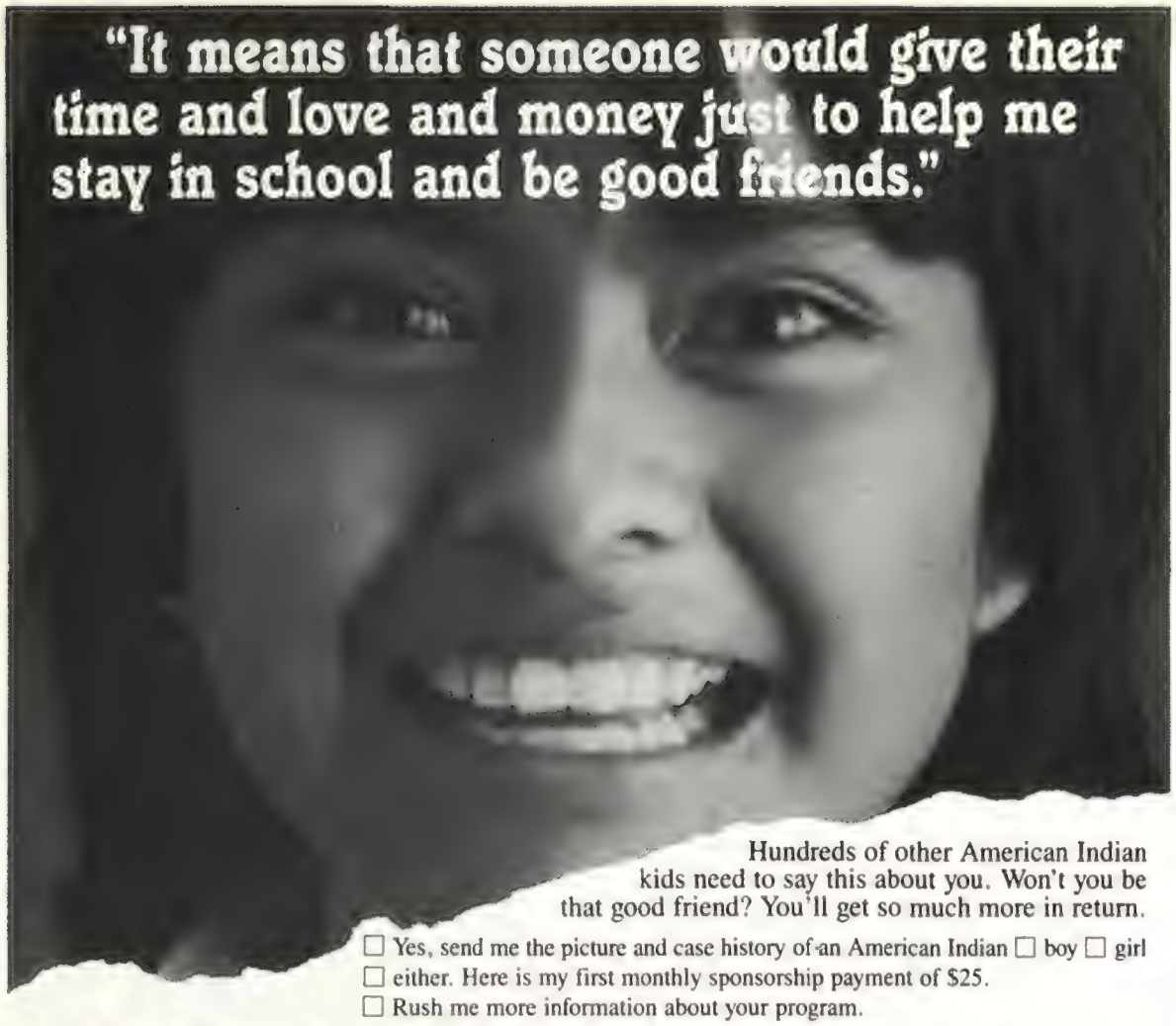

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Three Degrees Above Zero: Bell Labs in the Information Age
Jeremy Bernstein
Scribner's, $17.95

Just about everybody has heard of Bell Labs, but it takes a book like this to make the nonspecialist realize just what an impact this household name has had on our lives. Bell Labs is no more about "just telephones" than *Moby Dick* is concerned with "just whaling." If it hadn't been for the discoveries that came out of Bell Labs, there would not be an "information age" as we know it today.

The title comes from the observation that the average temperature of the Universe is three degrees above absolute zero. This was discovered 20 years ago by Arno A. Penzias and Robert W. Wilson, two Nobel Prize-winning Bell radio astronomers. And why does Bell Labs have world-class radio astronomers on the payroll? That's only one of the many fascinating things this revealing study tells.

The story of Bell Labs is the story of technological innovation. But *Three Degrees Above Zero* is the story of the people who made new things happen. As Bernstein says, "It dawned on me that the way to write about Bell Labs was, in the first instance, to break the subject up into people; to construct a kind of mosaic of people that, when assembled, would make a coherent sample of the whole."

Since James D. Watson's groundbreaking *The Double Helix*, it has been OK for scientists to be, well, like people. And Bernstein, a seasoned *New Yorker* journalist, is at his best dealing with the human drama of Bell. He is slightly less successful in describing the technologies—computers, optical communications, transistors, solid-state physics and the like. Still, once you've read the book, you should have a solid understanding of these technologies which are changing many of our eternal verities (and if you don't believe this, ask an Arizona copper miner what fiber optics did to the copper market—and his job).

One of the most interesting sections of *Three Degrees Above Zero* is the chapter on BELLE, the chess-playing computer that can beat 99 percent of the players in the world today. Last year the International Chess Federation gave it ("her" to some) an official master rating. One anecdote provides an indication of BELLE's

savvy: some years back, the great Bobby Fischer made a brilliant queen sacrifice against Donald Byrne in what was later called the game of the century. It was truly a stroke of genius and 14 moves later Byrne gave up. Bernstein asked Ken Thompson, one of BELLE's creators, if the computer, given the same position on a chessboard, could have found the move. Thompson replied that "he had done the experiment. In 19 seconds the machine sacrificed its queen and then went on to win the game."

But the razzle-dazzle of basic research constitutes only ten percent (in terms of money and manpower) of laboratory effort. As Bernstein writes, "The other 90 percent has been devoted to development connected fairly directly to communications and, primarily, to what is known at Bell as telephony—the art and science of the telephone." This may be the most striking part of the Bell Labs story—like watching the Olympic gymnasts last summer. The art seems effortless, but it is only when it's rerun in slow motion (as Bernstein does with telephony) that you realize the amount of interrelated expertise that goes into an "effortless" performance.

Jack D. Kirwan
Assistant editor, *The Energy Journal*,
University of Arizona

Stravinsky, Selected Correspondence, Volume II
Edited and with commentaries by Robert Craft
Knopf, $30

No creative artist in any field at any time, it seems, has been so exhaustively, obsessively, excruciatingly documented in both life and work. Fortunately, the master at hand is worthy of the treatment: Igor Stravinsky was the best kind of great composer, the kind that glares defiantly into the grizzled visage of tradition and demands changes. He obviously knew his worth, and knew enough to save every scrap of evidence of that value—even to the point that one entry in this *Selected Correspondence* is a carbon of a 1912 telegram described as "illegible."

One editorial decision above all others elevates the value of this ongoing collection beyond cavil: the brilliant plan to group the voluminous material not in a single chronology but as a series of clumped entries around respective recipients.

What emerges, therefore, is a series of short, pointed studies almost like one of those chess tourneys where one master takes on and pulverizes all comers on all levels of proficiency. Yet, with the guidance of Craft's copious annotations, a big picture emerges: a brash young exotic newly come to Paris in 1911 at the age of 29, carefully suave before all the right people. The earliest preserved letter is a 1911 note to Florent Schmitt, dreary pedant and abject compositional incompetent. The note drips honey and sweet oils; a footnote from Craft assures that Stravinsky's true estimate of Schmitt's music was, as it should be, "unprintable."

Craft has lived well from his association with Stravinsky, although it is too early to winnow fact from gossip and to discern which of the two actually said and wrote what. But these volumes—a third and last will include correspondence with Ravel and Debussy, an enticing prospect—represent honorable service. You can approach Stravinsky's music with plenty of reservations; many do. Yet in this series of case

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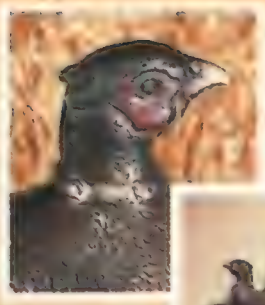

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studies about an authentic genius getting on, in and with the world, there are lessons for anyone in the arts, whether creator or consumer.

That's not the same as saying, of course, that the tiny, gnarled figure of Stravinsky himself comes out wearing angel wings. There is a harrowing chapter in this second volume, an assemblage of correspondence relative to Stravinsky's attempt to get performances and publication of, and payment for *The Firebird*—easily his most popular, most often ripped-off score, and the one that brought in the least income. Over a span of 46 years (1912-1958) the battles rage; along the way Stravinsky alienates conductors, publishers, even the good gray judge, Olin Downes of the *New York Times*.

A sad, sometimes tedious tale, perhaps, but it's also the chronicle of a process a lot of later composers will easily recognize as a slice out of their own lives. They will also take some comfort in Stravinsky's frequent outbursts as one or another of his famous scores comes up against the threat of mutilation. You can hear the rage in the stentorian messages to the conductor Ernest Ansermet—himself an ardent advocate of Stravinsky's music—over a proposed tiny cut in the *Card Game* ballet score; you can sense the resignation as he writes to another old ally—the noble Pierre Monteux, who had conducted the premiere of *The Rite of Spring* on the day modern music began—to say that yes, the planned program is short, but if another piece is added, with so little rehearsal time as it is, disaster looms.

Perhaps this selected correspondence goes a little too far in scraping off the romance of being a composer. For all the obsession with scraps and shards, these books add up to an illuminating document of vital importance. This *is* what it's like to be a composer.

Alan Rich
Music critic of *Newsweek*

The Weaker Vessel
Antonia Fraser
Knopf, $19.95

Once again, we are transported to 17th-century England by Antonia Fraser. *The Weaker Vessel* shares with *Cromwell* and *Royal Charles* the same engaging narrative style and impressive research skills. This, however, is a portrait of an age, not of a man. In an interesting departure

from the biographical art for which she is justifiably well known, her new book is a social history of the state of women in England at that time.

Using original sources—letters, diaries, memoirs, parish registers—and an exhaustive range of secondary material, the author pieces together a vivid pastiche of countesses and no-accounts, dairymaids and duchesses. While the sum is somewhat less coherent than the parts, the breadth of the information and her enthusiasm for the subject make this book an important contribution to the history of women.

Clearly undaunted by the meagerness of first-hand accounts, Fraser ferrets out every available source for material. From Pepys, Lord Rochester, women diarists and preachers, women playwrights (there were a few) and the ever-anxious male moralists, she gleans a human drama that is as poignant as it is arresting.

In 17th-century England, the average life expectancy was 35 years. Among aristocratic women, "45 percent died before the age of fifty, one-quarter from the complications of childbirth." There were the additional risks of disease and infection from perpetual pregnancies and desperate abortions. Withal, women were expected to bear their illnesses and their children with equal modesty and silence. After all, they were the granddaughters of Eve, according to the prevailing moralistic view. Indeed, a prayer written for women in labor suggested they dwell on this legacy: ". . . the smart of the punishment which thou [Lord] laidst upon me being in the loins of my grandmother Eve, for my disobedience towards thee. . . ."

If childbirth and its attendant hazards were survived, the joy of motherhood was rarely unalloyed. The infant mortality rate was staggering, regardless of class. This was doubly poignant since most marriages were arranged for family and fortune. If a woman wanted love, she best look for it through motherhood.

Irrespective of her bartered and loveless state, the contemporary expectations of wifely obedience were stringent indeed. In a letter to Margaret Godolphin, John Evelyn wrote that "marriage entitles [the husband] to your person, and to all you bring with it of worldly goods, and he can do with it what he pleases without your consent."

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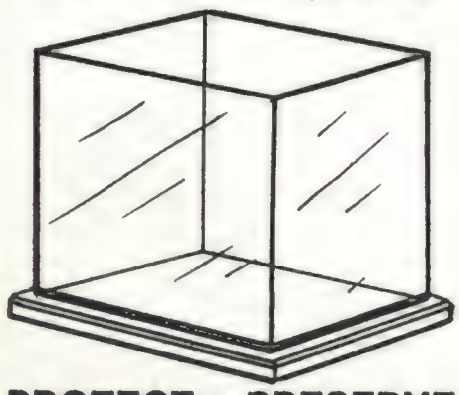

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with the accepted behavior of men. Profligacy and infidelity, particularly among aristocrats, was the order of the day. The dissolute poet and satirist Rochester sums it up:

> If I, by miracle, can be
> This live-long minute true to thee
> 'Tis all that Heav'n allows.

Rochester and his "merry gang" were only reflecting the tone of the Court. The Queen, Catherine of Braganza, learned to tolerate the countless mistresses and illegitimate children of Charles II. Her modesty and forbearance were thus celebrated by that percipient poet, John Dryden: "The best of Queens, the most obedient wife . . . His life the theme of her eternal prayer. . . ."

Whether Queen or charwoman, the educational opportunities for women were severely—and purposefully—limited. According to the author, "girls were not permitted to take the ordinary public grammar course (with its heavy grounding in Latin)"; also, "a figure of 90 percent illiteracy amongst women is given for London—the most favourable area—in 1600, declining in 1640 quite sharply to around 80 per cent. . . ."

Again, the Court set the tone. James I, who ruled until 1625, observed that "to make women learned and foxes tame had the same effect: to make them more cunning." His namesake and later successor James II also stressed domestic rather than intellectual accomplishments—to the distress and detriment of his daughter Anne. She found herself both widow and ruler on the death of William and completely uneducated except for French. Nell Gwynn, one of Charles' favorites—remarkable as she was in other ways—was so illiterate she could barely sign her initials even at her life's end.

Educated women did pop up in the form of Quakers, petticoat authors and teachers. They were treated, however, with "cheerful ridicule" at best and physical abuse and incarceration at worst. Of course, there were other escapes from the taut boundaries of domestic subordination, such as prostitution and widowhood. The author explores them all with meticulously researched examples. These colorful exceptions add texture—and, at times, a note of hope—to a grimly fascinating historical investigation.

Jill Merrill
Washington writer

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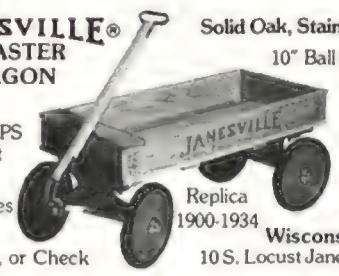

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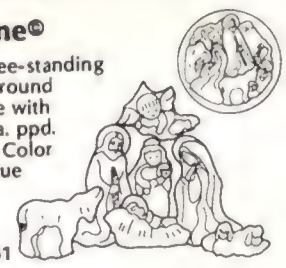

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People of the Ice Whale
David Boeri
Dutton, $19.95

In *People of the Ice Whale*, an account of the Alaska Eskimo hunt for bowhead whales, David Boeri has written something to offend each interested party. Possibly that is why the end product appears honest, even moving. Boeri is a sometime commercial fisherman and coauthor of *Tell It Goodbye, Kiddo*, about the New England fisheries. During the spring seasons of 1978, 1979 and 1980 he gained enough acceptance in the Eskimo villages of Gambell and Barrow to become a peripheral (but pulling his own weight) member of a whaling crew in each.

The Eskimo people inhabit a rim of far northern settlements between Greenland and Siberia, stretching across Canada and Alaska. Distance and isolation have led to some differences in customs, but as a people they retain a remarkable homogeneity. However, unlike the Eskimos I know in Labrador who are half-assimilated with the white man after several generations of living together, those in Alaska have met Western culture head-on only in the past generation; their own cultural insecurity far exceeds that of their Canadian counterparts.

The Alaska situation that Boeri encounters is a no-win classic: that of an endangered society that pins its cultural identity on the hunt for an endangered animal. The book provides no answer. If one exists, it must apparently be either a compromise or the sacrificed interests of one endangered party.

Those will be upset who cherish an image of native peoples who live in such harmony with nature that they cultivate their survival skills and kill only what they need. Boeri's account of his three springs with Eskimo whalers is indeed full of appreciation for their kindness and hospitality, their gentle philosophy, their humor.

He also gives a blunt account of Eskimo ineptitude and waste in hunting the bowhead whales. The villagers wound, perhaps mortally, far more whales than they capture. Often this is because they fail to care for their equipment or to learn how it works best. Worse, in a kill he witnessed, the villagers of Gambell, through disorganization and indifference, cut from the carcass only the blubber. They let most of the meat rot, the meat that is supposed to be one of the reasons they *must* hunt whales. (The participants in another kill, in Barrow, made better use of the whole whale. They also worked harder to catch it, camping for weeks on the ice waiting for the opportunity.)

Such information advances the case of those opposed to any whaling, especially since the bowhead is rated one of the most endangered of all whale species. The International Whaling Commission allows Alaska Eskimo subsistence whalers the only bowhead quota in the world, and this reluctantly, under pressure from the otherwise antiwhaling United States. Boeri counters his concern about the wasteful practices with a case against the accuracy of the computer models that show the bowhead to be so desperately endangered. The facts of his argument make some sense, since whale counting by any means involves assumptions. Those who prefer to err on the side of safety would disagree.

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Boeri suggests that the militant anti-whalers have little understanding of or sympathy for the Eskimo's cultural need to hunt whales. He's right: they are mainly urbanites who have no need to shed blood in order to obtain their meat. However, it could be counterargued that this gives them a larger perspective. Their triage may be valid—to force the Eskimos to work it out somehow, while protecting every one of the magnificent and endangered bowhead whales. One could point out, at least from several thousand miles away, that the Alaska Eskimos have given up other parts of their culture, when it suited them, to take advantage of the larger world's offerings in ways they consider to be desirable.

"In a society battered by change and postmortems on Eskimo culture," Boeri writes, "catching a whale for one's people was tangible proof of being Eskimo." He describes the cathartic excitement that grips the entire community when a whale is finally killed, an event that has much to do with cultural identity.

The Eskimo society that Boeri depicts is truly suffering an identity crisis. The world's abundant technologies have weaned it in a leap from the slow-paced, hard world of sled dogs for transportation, storytelling for entertainment and foraging for food, to a world of alcohol, television, store clothes, canned food and instant potatoes—and "snowgoes": roaring little vehicles that move faster—requiring less care—than dogs, but sometimes run out of gas and strand a traveler to die in the harsh Arctic.

Boeri's book suggests an answer that might at first offend the Alaska Eskimos, assuming that the IWC continues to permit them a limited annual quota of some dozen-and-a-half bowhead kills. (Remember that the bowhead whales are now endangered, not through any fault of the small Eskimo hunt conducted for centuries, but because 19th-century Yankee whaling ships and later those of other civilized nations invaded traditional Eskimo grounds to decimate the stocks with terrible greed and waste.)

The answer would be for the Eskimos to approach whaling like professionals, killing what they strike and using what they kill. This would at least cut down the needless pain and probable wasted death of whales struck ineptly. To be specific, from examples in *People of the Ice Whale*, the Eskimo whalers could: pack fresh dry powder in their harpoon bombs so they explode when lodged in the whale; keep harpoon guns lubricated and free of rust so that a trigger fires on first squeeze; study simple whale anatomy so that the strike will be in an effective place; learn discipline to hold fire until the whale is close enough and exposed enough in the right place for reasonable certainty of a kill; make or acquire flensing knives and other proper tools; and pause to examine the carcass logically, in order to butcher a dead whale so that all its edible parts are saved.

To many without a cultural stake in it, killing a whale is an outrage. Others would concede, in a world of devastating changes, the need for Alaska Eskimos to continue a limited hunt. But even in our wasteful society, every killed whale should count.

William McCloskey
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Additional reading

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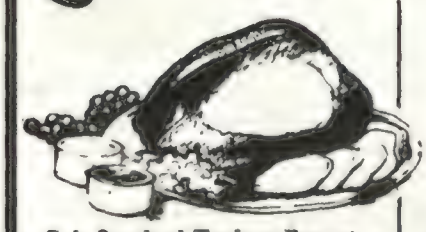

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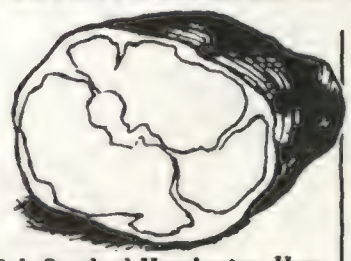

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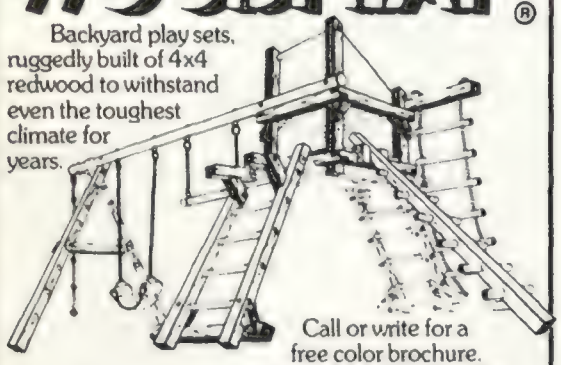

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The Complete Letters of Vincent van Gogh (3 vols.), New York Graphic Society/Little, Brown, 1978
The Complete van Gogh by Jan Hulsker, Abrams, 1980
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The Evolution of Urban Society: Early Mesopotamia and Prehispanic Mexico by Robert McC. Adams, Aldine, 1966

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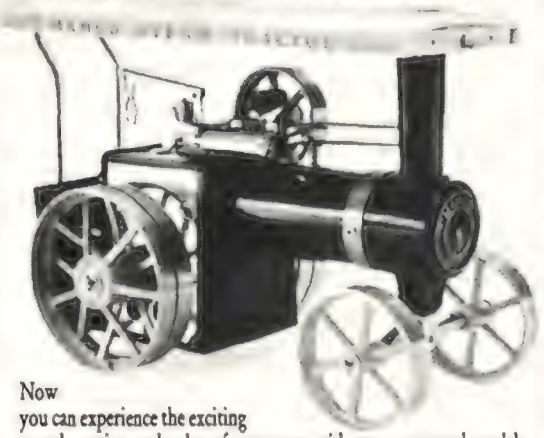

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Roman elections (p. 130)

Daily Life in Ancient Rome by Lionel Casson, American Heritage, 1975

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Cardano: The Gambling Scholar by Oystein Ore, Dover, 1965

Centuries of Childhood: A Social History of Family Life by Philippe Aries, Vintage, 1965

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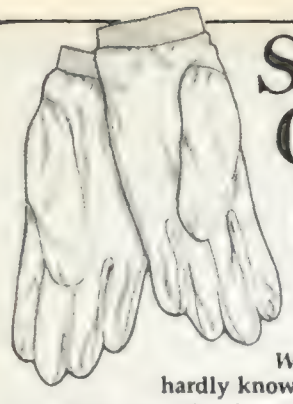

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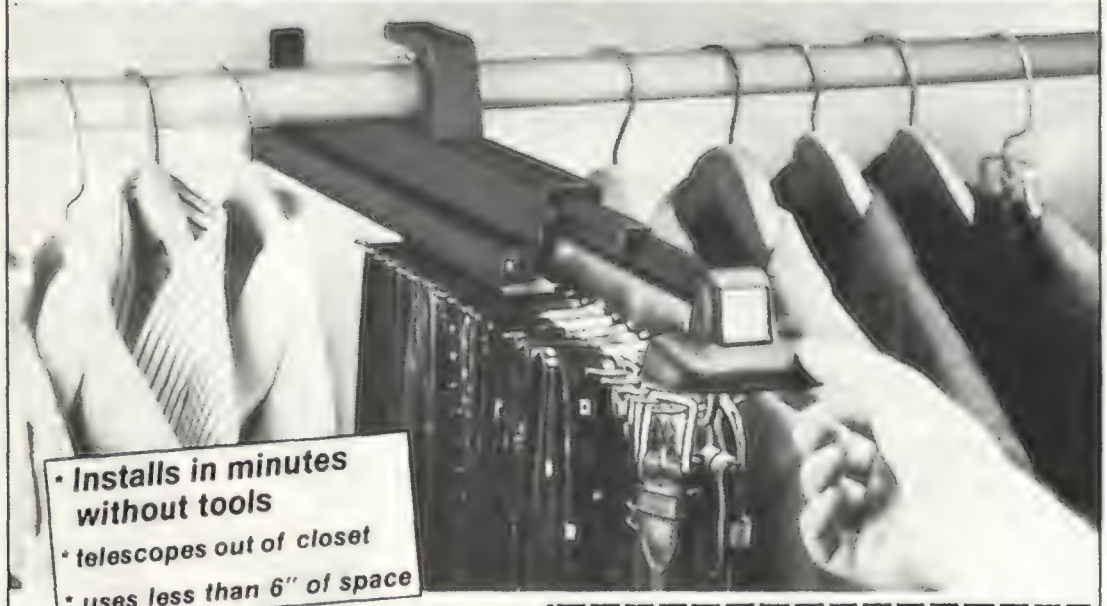

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Smithsonian highlights

This month, the Hirshhorn Museum & Sculpture Garden is celebrating its tenth anniversary with a major exhibition entitled *Content: A Contemporary Focus, 1974-1984*. Representing the "post-modern" era—as this past decade has often been called—will be 157 American and European works in numerous media: paintings, photographs, constructions, installations, video art and performance events. *Content* opens October 4 and will continue through January 6, 1985. For further information about this exhibition or any other Smithsonian activities this month, call the Smithsonian Visitor Information Center at (202) 357-2700.

Special October exhibits and events

National Air and Space Museum
The Art of Robert McCall (through September 1985) See *Highlights continued.*
The Ultimate is to Survive (October 11; 7:30 P.M.) Brig. Gen. Charles E. "Chuck" Yeager, USAF (Ret.) discusses his career.
Flight in Film Series (October 1, 8, 15, 22, 29; 7:30 P.M.) Among films shown will be *Destination Moon* (1950), *L'Espoir* (1938).
The "Canals" of Mars (October 6; 10 A.M.) Monthly sky lecture.

Hirshhorn Museum & Sculpture Garden
Content: A Contemporary Focus, 1974-1984 (October 4-January 6, 1985).
European Modernism: Selections from the Permanent Collection (through January 13, 1985).

National Museum of American Art
Werner Drewes, Sixty-Five Years of Printmaking (October 5-January 1, 1985).
Fantasy and Imagination: Sculpture by Eugenie Gershoy (through January 20).

National Museum of American History
Eleanor Roosevelt: First Person Singular (through January 6, 1985).

National Museum of Natural History
Treasures from the Shanghai Museum: 6,000 Years of Chinese Art (through November 30).
Stilt Dancers of Longbow Village (October 5; noon, Baird Auditorium) Film.
Last Stronghold of the Eagles and *Osprey* (October 10, 11; noon; Baird Auditorium) Free films in observance of National Birds of Prey Conservation Week.

Cooper-Hewitt Museum (New York)
Objects of Adornment: Five Thousand Years of Jewelry from the Walters Art Gallery, Baltimore (October 16-January 6, 1985).
Damask (through November 4) Historic and contemporary silk, linen and wool fabrics.
Design in the Service of Tea (through October 28).

National Portrait Gallery
Charles Martin Conlan and the Immortals of Baseball, 1915-1930 (October 13-March 31, 1985) Photographs.

Renwick Gallery
Chicago Furniture, 1833-1983: Art, Craft and Industry (October 12-April 7).

Exhibition catalogs

Catalogs available at this time include:
Treasures from the Shanghai Museum (paper, $10.95)
Yesterday's Tomorrows (paper, $17.95; cloth, $29.95)
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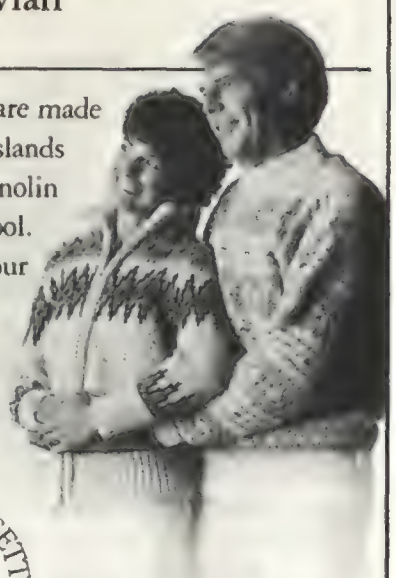

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Resident Associate events

To become a Resident Associate, or to find out about the many other activities presented monthly, or for fee and ticket information, call 357-3030. Here are some October events:

Architecture in Austria (October 1; 8 P.M.) Architects Hans Hollein and Wilhelm Holzbauer will discuss their work.

Four on the Scene (October 4; 7:30 P.M.) Vito Acconci, Sandro Chia, Jenny Holzer and David Salle discuss their art.

The Star-Apple Kingdom (October 7; 7:30 P.M.) Poetry by Derek Walcott; reggae, calypso and soca performed by Nathan Davis and the ensemble Tomorrow.

The English Village: A Way of Life Through Nine Centuries (October 9; 6 P.M.)

Gold in Azure: 1,000 Years of Russian Architecture (October 13) All-day seminar with William Brumfield.

Judy Chicago and "The Birth Project" (October 16; 8 P.M.) Slide lecture.

New Zealand Film (Four Wednesday evenings beginning October 17) Series presents recent feature films, including *Utu* and *Sleeping Dogs*. All D.C. premieres.

Kaze-no-ko (October 18; 7:30 P.M.) Japanese performing troupe.

Mary Leakey: Disclosing the Past (October 19; 8 P.M.) Legendary archaeologist.

20th Century Consort (October 20; 4:30 P.M., lecture; 5:30 P.M., concert) Concert features music with political overtones.

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The Contributing Membership Program supports the Smithsonian's research and educational activities through annual membership contributions in six categories: Supporting, $50; Donor, $100; Sponsoring, $250; Sustaining, $500; Patron, $1,000; and the James Smithson Society, the highest level of the Smithsonian Associates, $1,500. (Contributions are tax-deductible within legal limits.) In addition to benefits of Smithsonian Associates, Contributing Members attend elegant evening previews of museum exhibitions; receive behind-the-scenes museum tours, a special edition of a richly illustrated Smithsonian publication and the Smithsonian Engagement Calendar. For information, contact Contributing Membership Program, A&I 1190A, Smithsonian Institution, Washington, D.C. 20560.

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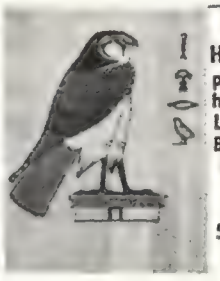

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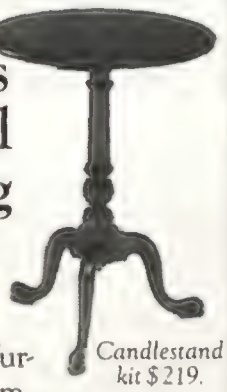

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Robert McCall at NASM

An artist who is hooked on space has spent his life painting what we have done there—and what may be coming

In 1963, when astronaut Gordon Cooper was being prepared for his orbital flight around the Earth in a Mercury capsule, artist Robert McCall was there. "It was thrilling to be with Gordon as he was being suited up and to watch the expressions on his face," says McCall today. "He was taking a very great risk." McCall followed as Cooper walked to the gantry (the big steel structure that is alongside the upright rocket) and rode up in its open-cage elevator to the platform adjoining the hatch. "And then *I* got in the elevator," McCall relates, "and all the way up, I imagined myself in Cooper's shoes." When McCall stepped out, he saw technicians in white smocks sealing Cooper into the spacecraft. And—as he does at all the launchings he attends—he sketched nonstop until the warning came for all personnel to clear the gantry.

That was the first time McCall was present for a manned launch, but as he says, "You get in the habit of wanting these experiences." Since then, he has been on hand for more than 25 manned launches, as well as splashdowns, briefings and long hours at mission control. He has documented them all in sketches and, later, paintings, sometimes under contract to NASA and sometimes on his own.

The result of this insatiable appetite for all things space-related is a rich body of work representing not only our real space program, but also images as varied as "alien environments" for *Star Trek, The Motion Picture*, floating shopping-center pavilions of the future (top), and giant, unmanned solar sails (opposite).

Until September of next year, the optimistic and futuristic works of Robert McCall will be on view in NASM's Flight and the Arts Gallery. Meanwhile, McCall is planning to attend the next space-shuttle launch to continue his lifelong project. And he hopes that, when civilians are allowed to go on the shuttle, he will be on board instead of sketching from the sidelines.

Constance Bond

Shopping-center pyramids hover above land in futuristic *Sky Pavilions*, 1964.

Concept art for *Star Trek, The Motion Picture* shows Starship Enterprise.

In lithograph, Apollo command module links with ascent stage of lunar lander.

Sun-powered *Sails of the Future*, 1964, glide through vacuum of outer space.

Acrylic study, 1975, was for NASM mural showing conquest of the moon.

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Christmas at the Smithsonian December 7-9: Welcome the holidays with behind-the-scenes tours, music and festive dining at selected museums.

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Puerto Rico February 4-13: Observe rare tropical birds and flowers and travel to remote areas of the island—from mountain rain forests to white sandy beaches.

Yellowstone in Snow February 15-25: Ski across magical landscapes to observe wintering elk and bison, steaming geysers.

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Savannah and Charleston March 23-30 or March 31-April 7: Enjoy warm Southern hospitality on a tour of historic homes, inland gardens and nearby plantations.

Okefenokee Swamp March 30-April 6 or April 6-13: A flat-water canoe trip through the serene waterways of this unique wildlife refuge.

Arizona in Spring April 9-17 or April 11-19: From Tucson explore the beauty of the Sonoran Desert, Madera Canyon and Chiricahua Mountains.

Chesapeake Bay Cruise May 18-25: Enjoy fresh crabs and oysters aboard the elegant yacht, *Nantucket Clipper*, while learning about the bay's history. Cruise to such charming 18th-century towns as Annapolis, St. Michaels and Williamsburg.

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Classical Greece October 13-24: Sail to the Aegean islands and visit the grand sites of antiquity on the mainland.

Bahamas October 26-November 4: Depart from Fort Lauderdale for a Caribbean adventure. Spend five days exploring Andros Island and three days sailing in the Berry Islands.

The Atlantic Crossing December 6-21: A sailing adventure from the Canary Islands to Antigua on the four-masted square-rigger, *Sea Cloud.*

Mexico & El Tajín November 23-December 5, January 11-23 or March 22-April 3: Sample the rich, diverse cultures in and around Mexico City and Veracruz.

Pacific Coast of Mexico December 21-30: Beautiful uninhabited islands await your discovery on this adventure cruise between Puerto Vallarta and Mazatlán.

People's Republic of China, 1985: Exclusive tours to a variety of destinations are led by a Sinologist and include intensive pretour briefing.

Yucatán Adventure January 17-29 or February 14-26: From Mérida, tour extraordinary Maya ruins in the company of a pre-Columbian archaeologist.

Zapotec & Maya Mexico January 31-February 12 or February 28-March 12: Discover the archaeology and colonial cities of Oaxaca, San Cristóbal de las Casas and Uxmal, traveling from highland to rain forest to the Yucatán.

Indian Wildlife Safari January 25-February 21: Travel by elephant and jeep to observe rare species of birds and animals in exotic India and southern Nepal.

A Hike in New Zealand February 6-22: From Lake Te Anau to Milford Sound, discover wild flowers, crystalline lakes and snow-capped peaks on the Milford Track.

New Zealand February 6-23: Relish glorious scenery on this in-depth tour with talks on natural history, the Maori and Parliament. Includes a family visit.

Indonesia March 10-31: Cruise beyond the ordinary to the islands of the Java Sea. Study natural history and observe local customs and traditional rituals.

Kyoto Seminar March 15-31: Live Japanese-style. Field trips complement lectures on art, history, religion and language.

Norman Countryside April 6-21 or October 5-20: The ancient city of Rouen, capital of lush Normandy, provides a superb setting for walking tours, museum visits and special excursions nearby, including Norman churches, elegant beach resorts and Monet's Giverny.

Canals and Old Masters April 10-24: Art museums, historic tours and spring flowers highlight four days in Amsterdam. Then sail by riverboat to explore the cobbled streets of medieval Dutch and Belgian port cities, plus Brussels.

Ecuador and the Galápagos Islands May 11-24: After visiting Quito and the Andean countryside, board the *Santa Cruz* for a study voyage to Darwin's famed islands.

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Digging Up Rome October 14-19: Well-known authorities on the art, architecture and fauna of the classical world use archaeological finds, eyewitness accounts and numerous slides and films to examine the art and daily life of this vibrant city at the time when all roads led there.

Aircraft Restoration: How To October 21-25: The master craftsmen of the National Air and Space Museum share their many techniques in Smithsonian workshops.

Genealogical Research October 21-26: Taught by well-known authorities, participants learn how to conduct research in major genealogical repositories.

Connoisseurship of Chinese Art November 4-9: Expert Shirley H. Ganse lectures on fine Chinese decorative arts and paintings in private and public collections, developing an eye for the best in terms of style and technique and detection of copies and forgeries. Includes private guided tour before public hours of the acclaimed exhibition, "Treasures from the Shanghai Museum—6,000 Years of Chinese Art," featuring hundreds of objects never before seen in the United States.

Golden Age of the Aztecs November 11-16: A popular pre-Columbian expert sheds the latest light on one of the great epics of history—the rise and fall of the complex Aztec civilization—in lavishly illustrated lectures and tours of a famous collection. Includes ancient masterpieces of art and architecture, recent important archaeological excavations in Mexico and a special guided tour of the outstanding pre-Columbian collection of 400 items at Dumbarton Oaks, Harvard University's renowned research center.

Coming in the spring:

Animal Communication: Suppression, Deception, Downright Lies and Sometime Truth March 24-29

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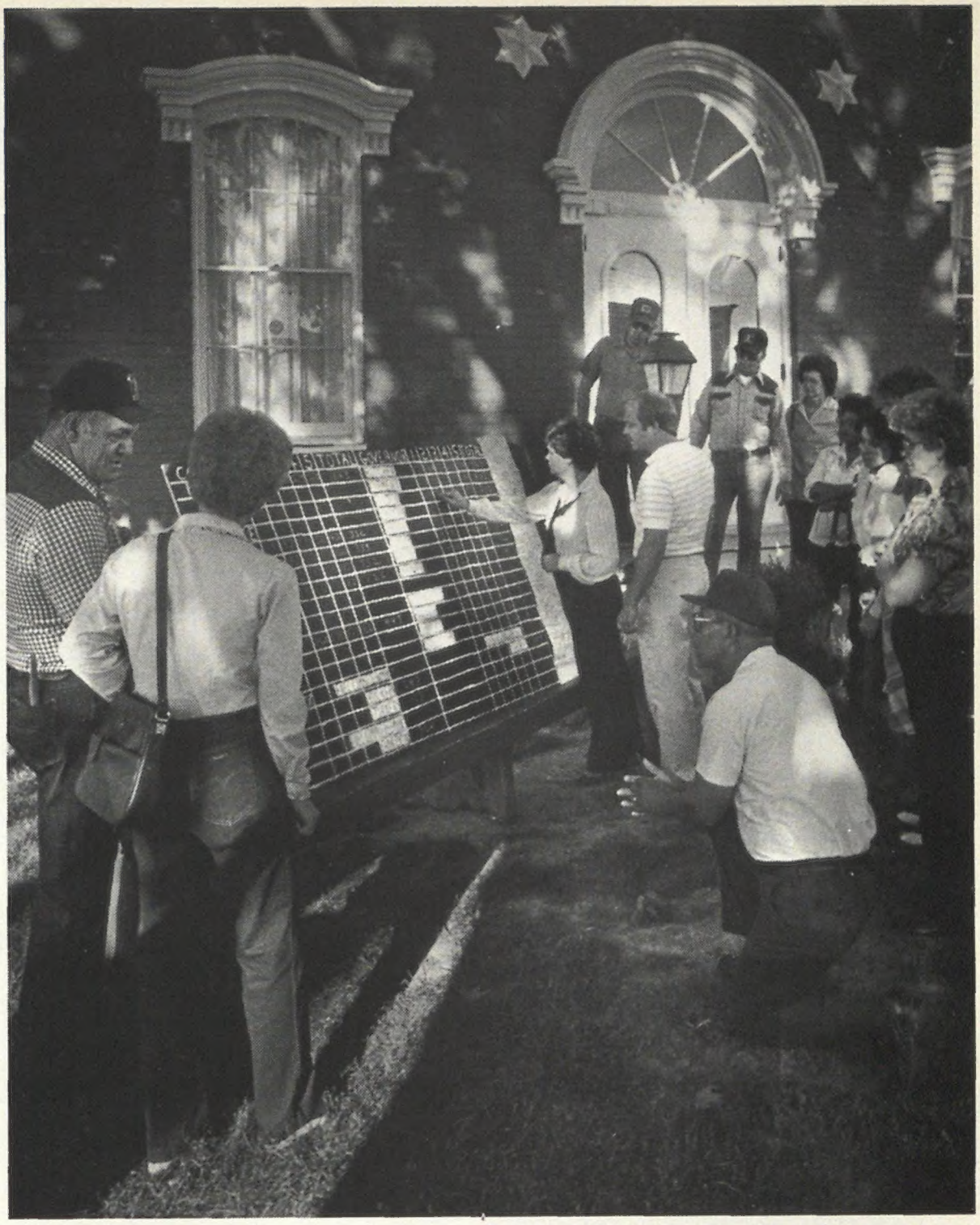

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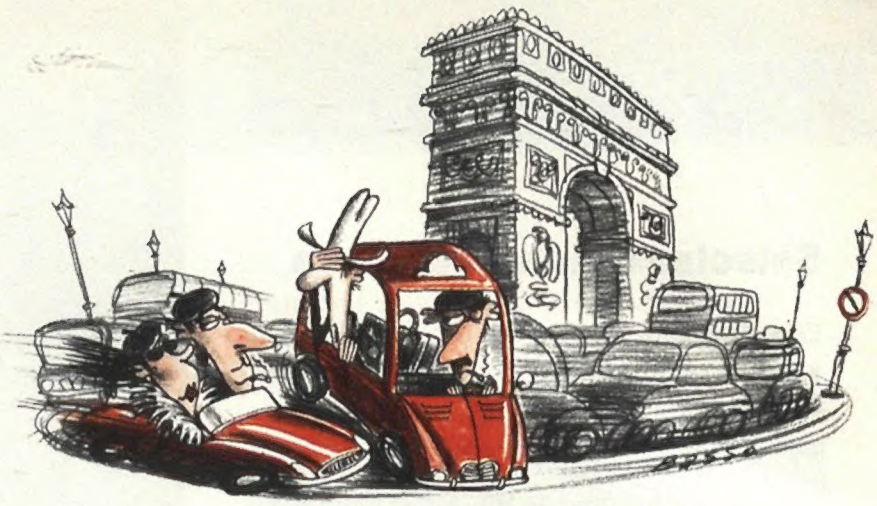
By Rudolph Chelminski

Bid a fond adieu to priorité à droite



Any American who has ever jockeyed a car around Europe knows that driving behavior reflects the national psyche. Behind the wheel the English practice heroic restraint, Scandinavians are safe and stolid, Italians wildly demonstrative.

It is the French, though, who have the most creative flair. Even after years of living in France, I am still dazzled by Gallic U-turns in the middle of busy boulevards, and bowled over by agile zippings the wrong way into one-way streets to grab a parking spot. French drivers have a positive genius, in fact, for creating *new* parking spots—astraddle the white line on the wider streets and boulevards, thump-bump on the Parisian *trottoirs*, beside fire hydrants or bus stops, entryways, crosswalks, sometimes even in municipal flower beds (though honesty requires me to point out that only *small* cars do this).

Americans driving in France are above all struck (as it were) by the famous code of the road known as *priorité à droite*. As much a national institution as garlic with escargots, *priorité à droite* is the other side of the coin of creativity. For this most self-expressive and self-indulgent of peoples limits its natural tendency toward mayhem on wheels with a rule that, like Cartesian logic itself, another French invention, is rigid, absolute and infallible.

Of course, *priorité à droite* means, simply, that unless otherwise indicated, the guy to your right *always* has the right-of-way. And as every American who has ever timidly edged his car into French traffic knows, any French driver who *has* right-of-way will exercise it, which simplifies matters considerably.

Presumably, *priorité à droite* is a hangover from horse-and-buggy days, but never mind: a rule is a rule. It is because of *priorité à droite* that most French drivers manage to stay alive at all, and some of France's most spectacular accidents result from trying to ignore it (*refus de priorité*). Where the famous rule creates pure art, transforming chaos into order, is at the *rond-points*, France's spacious traffic circles. But the most perfect site will always be the Etoile, the huge circle around the Arc de Triomphe at the top of the Champs-Elysées, where no less than 12 avenues converge from all points of the compass.

Every driver worth his salt enters the Etoile at great speed, and because of his privileged position in relation to the counterclockwise flow of cars, at entry he automatically has *priorité* over everyone else. But at the next avenue he, in turn, is "prioritéd" by traffic launching into the circle from *his* right. And so it goes, with everyone driving madly round and round, each driver looking to the right and knowing that everyone to the left will automatically get out of his way.

Now that *sounds* all right. But at certain moments, there is such a tangle of *priorités* and blocked cars that nobody moves at all. It is perfect beauty, almost Grecian in its classic simplicity. The polychrome sea of cars, row on row, is held as rigidly in place as the stained glass in the rose window at Notre-Dame. I would rather contemplate a good *priorité* blockage than watch Nureyev dance.

As far as I know, for as long as automobiles have existed, the French have been the only people who have applied *priorité à droite* as the rule of the road. Doing so saved them expense on stop signs. It also made things clearer for judges, lawyers and insurance agents. The problem was that drivers from other parts of Europe were constantly getting in trouble, especially at traffic circles, where, outside France, the universal rule is that the car already engaged in the traffic circle has the right-of-way over anybody wanting to come in. Endless numbers of studies have proved that traffic flows more freely this way, and besides (except in England, and that's another story), you have a better view of the enemy if you are looking for him out of the window to your left than if you have to crane your neck around your passenger to the right. All in all, then, in Common Market Europe, the argument for giving right-of-way to the left in traffic circles was seen as irrefutable.

And so it came to pass this year that the French authorities changed a tradition that has held since the days of Napoleon. But naturally they did it in a French way, that is to say subtly and with the complication they adore. From now on *priorité à droite* remains the national rule, but at traffic circles it becomes *priorité à gauche*. Not *all* traffic circles, mind you, but just certain ones, selected by local authorities.

I for one am pleased by this institutionalized inconsistency. For a while I was afraid the French were going to become boringly effective in dealing with traffic. I especially feared the demise of the Gallic gridlock at the Etoile. But it soon became apparent that French traffic authorities had a vision far vaster and more penetrating than mine. With *priorité* now both *à droite* and *à gauche*, we are guaranteed a spectacle of creative driving more satisfying than ever.

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